

NASA SP-7011 (449)
October 06, 1997

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES



National Aeronautics and
Space Administration
Langley Research Center
**Scientific and Technical
Information Program Office**

The NASA STI Program Office . . . in Profile

Since its founding, NASA has been dedicated to the advancement of aeronautics and space science. The NASA Scientific and Technical Information (STI) Program Office plays a key part in helping NASA maintain this important role.

The NASA STI Program Office is operated by Langley Research Center, the lead center for NASA's scientific and technical information. The NASA STI Program Office provides access to the NASA STI Database, the largest collection of aeronautical and space science STI in the world. The Program Office is also NASA's institutional mechanism for disseminating the results of its research and development activities. These results are published by NASA in the NASA STI Report Series, which includes the following report types:

- **TECHNICAL PUBLICATION.** Reports of completed research or a major significant phase of research that present the results of NASA programs and include extensive data or theoretical analysis. Includes compilations of significant scientific and technical data and information deemed to be of continuing reference value. NASA's counterpart of peer-reviewed formal professional papers but has less stringent limitations on manuscript length and extent of graphic presentations.
- **TECHNICAL MEMORANDUM.** Scientific and technical findings that are preliminary or of specialized interest, e.g., quick release reports, working papers, and bibliographies that contain minimal annotation. Does not contain extensive analysis.
- **CONTRACTOR REPORT.** Scientific and technical findings by NASA-sponsored contractors and grantees.
- **CONFERENCE PUBLICATION.** Collected papers from scientific and technical conferences, symposia, seminars, or other meetings sponsored or cosponsored by NASA.
- **SPECIAL PUBLICATION.** Scientific, technical, or historical information from NASA programs, projects, and missions, often concerned with subjects having substantial public interest.
- **TECHNICAL TRANSLATION.** English-language translations of foreign scientific and technical material pertinent to NASA's mission.

Specialized services that complement the STI Program Office's diverse offerings include creating custom thesauri, building customized databases, organizing and publishing research results . . . even providing videos.

For more information about the NASA STI Program Office, see the following:

- Access the NASA STI Program Home Page at <http://www.sti.nasa.gov>
- E-mail your question via the Internet to help@sti.nasa.gov
- Fax your question to the NASA Access Help Desk at (301) 621-0134
- Telephone the NASA Access Help Desk at (301) 621-0390
- Write to:
NASA Access Help Desk
NASA Center for AeroSpace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934

Introduction

This issue of *Aerospace Medicine and Biology, A Continuing Bibliography with Indexes* (NASA SP-7011) lists reports, articles, and other documents recently announced in the NASA STI Database. In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Applied research receives the most emphasis, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the publication consists of a standard bibliographic citation accompanied, in most cases, by an abstract.

The NASA CASI price code table, addresses of organizations, and document availability information are included before the abstract section.

Two indexes—subject and author are included after the abstract section.

SCAN Goes Electronic!

If you have electronic mail or if you can access the Internet, you can view biweekly issues of *SCAN* from your desktop absolutely free!

Electronic SCAN takes advantage of computer technology to inform you of the latest worldwide, aerospace-related, scientific and technical information that has been published.

No more waiting while the paper copy is printed and mailed to you. You can view *Electronic SCAN* the same day it is released—up to 191 topics to browse at your leisure. When you locate a publication of interest, you can print the announcement. You can also go back to the *Electronic SCAN* home page and follow the ordering instructions to quickly receive the full document.

Start your access to *Electronic SCAN* today. Over 1,000 announcements of new reports, books, conference proceedings, journal articles...and more—available to your computer every two weeks.

**Timely
Flexible
Complete
FREE!**

For Internet access to *E-SCAN*, use any of the following addresses:

<http://www.sti.nasa.gov>
<ftp.sti.nasa.gov>
<gopher.sti.nasa.gov>

To receive a free subscription, send e-mail for complete information about the service first. Enter scan@sti.nasa.gov on the address line. Leave the subject and message areas blank and send. You will receive a reply in minutes.

Then simply determine the *SCAN* topics you wish to receive and send a second e-mail to listserv@sti.nasa.gov. Leave the subject line blank and enter a subscribe command in the message area formatted as follows:

Subscribe <desired list> <Your name>

For additional information, e-mail a message to help@sti.nasa.gov.

Phone: (301) 621-0390

Fax: (301) 621-0134

Write: NASA Access Help Desk
NASA Center for AeroSpace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934

Looking just for *Aerospace Medicine and Biology* reports?

Although hard copy distribution has been discontinued, you can still receive these vital announcements through your *E-SCAN* subscription. Just **subscribe SCAN-AEROMED** in the message area of your e-mail to listserv@sti.nasa.gov.



Table of Contents

Records are arranged in categories 51 through 55, the Life Sciences division of *STAR*. Selecting a category will link you to the collection of records cited in this issue pertaining to that category.

51	Life Sciences (General)	1
52	Aerospace Medicine Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.	9
53	Behavioral Sciences Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.	13
54	Man/System Technology and Life Support Includes human engineering; biotechnology; and space suits and protective clothing.	18
55	Space Biology Includes exobiology; planetary biology; and extraterrestrial life.	N.A.

Indexes

Two indexes are available. You may use the find command under the tools menu while viewing the PDF file for direct match searching on any text string. You may also view the indexes provided, for searching on *NASA Thesaurus* subject terms and author names.

Subject Term Index	ST-1
Author Index	PA-1

Selecting an index above will link you to that comprehensive listing.

Document Availability

Select **Availability Info** for important information about NASA Scientific and Technical Information (STI) Program Office products and services, including registration with the NASA Center for AeroSpace Information (CASI) for access to the NASA CASI TRS (Technical Report Server), and availability and pricing information for cited documents.

The New NASA Video Catalog is Here

Free!

To order your copy,
call the NASA Access Help Desk at

(301) 621-0390,

fax to

(301) 621-0134,

e-mail to

help@sti.nasa.gov,

or visit the NASA STI Program

homepage at

<http://www.sti.nasa.gov/STI-homepage.html>

(Select STI Program Bibliographic Announcements)

Explore the Universe!

Document Availability Information

The mission of the NASA Scientific and Technical (STI) Program Office is to quickly, efficiently, and cost-effectively provide the NASA community with desktop access to STI produced by NASA and the world's aerospace industry and academia. In addition, we will provide the aerospace industry, academia, and the taxpayer access to the intellectual scientific and technical output and achievements of NASA.

Eligibility and Registration for NASA STI Products and Services

The NASA STI Program offers a wide variety of products and services to achieve its mission. Your affiliation with NASA determines the level and type of services provided by the NASA STI Program. To assure that appropriate level of services are provided, NASA STI users are requested to register at the NASA Center for AeroSpace Information (CASI). Please contact NASA CASI in one of the following ways:

E-mail: help@sti.nasa.gov
Fax: 301-621-0134
Phone: 301-621-0390
Mail: ATTN: Registration Services
NASA Center for AeroSpace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934

Limited Reproducibility

In the database citations, a note of limited reproducibility appears if there are factors affecting the reproducibility of more than 20 percent of the document. These factors include faint or broken type, color photographs, black and white photographs, foldouts, dot matrix print, or some other factor that limits the reproducibility of the document. This notation also appears on the microfiche header.

NASA Patents and Patent Applications

Patents and patent applications owned by NASA are announced in the STI Database. Printed copies of patents (which are not microfiched) are available for purchase from the U.S. Patent and Trademark Office.

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the U.S. Patent and Trademark Office.

NASA patent application specifications are sold in both paper copy and microfiche by the NASA Center for AeroSpace Information (CASI). The document ID number should be used in ordering either paper copy or microfiche from CASI.

The patents and patent applications announced in the STI Database are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

National Aeronautics and Space Administration
Associate General Counsel for Intellectual Property
Code GP
Washington, DC 20546-0001

Sources for Documents

One or more sources from which a document announced in the STI Database is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below, with an Addresses of Organizations list near the back of this section. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source.

Avail: NASA CASI. Sold by the NASA Center for AeroSpace Information. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the citation. Current values are given in the NASA CASI Price Code Table near the end of this section.

Note on Ordering Documents: When ordering publications from NASA CASI, use the document ID number or other report number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in Energy Research Abstracts. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center—Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: ESDU. Pricing information on specific data, computer programs, and details on ESDU International topic categories can be obtained from ESDU International.

Avail: Fachinformationszentrum Karlsruhe. Gesellschaft für wissenschaftlich-technische Information mbH 76344 Eggenstein-Leopoldshafen, Germany.

- Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, CA. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.
- Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.
- Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration (JBD-4), Public Documents Room (Room 1H23), Washington, DC 20546-0001, or public document rooms located at NASA installations, and the NASA Pasadena Office at the Jet Propulsion Laboratory.
- Avail: NTIS. Sold by the National Technical Information Service. Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) are available. For information concerning this service, consult the NTIS Subscription Section, Springfield, VA 22161.
- Avail: Univ. Microfilms. Documents so indicated are dissertations selected from Dissertation Abstracts and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.
- Avail: US Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of \$1.50 each, postage free.
- Avail: (US Sales Only). These foreign documents are available to users within the United States from the National Technical Information Service (NTIS). They are available to users outside the United States through the International Nuclear Information Service (INIS) representative in their country, or by applying directly to the issuing organization.
- Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed on the Addresses of Organizations page. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Addresses of Organizations

British Library Lending Division
Boston Spa, Wetherby, Yorkshire
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, DC 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, TN 37830

European Space Agency–
Information Retrieval Service ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

ESDU International
27 Corsham Street
London
N1 6UA
England

Fachinformationszentrum Karlsruhe
Gesellschaft für wissenschaftlich–technische
Information mbH
76344 Eggenstein–Leopoldshafen, Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Center for AeroSpace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090–2934

(NASA STI Lead Center)
National Aeronautics and Space Administration
Scientific and Technical Information Program Office
Langley Research Center – MS157
Hampton, VA 23681

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, CA 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, MI 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library National Center
MS 950
12201 Sunrise Valley Drive
Reston, VA 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, AZ 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS914
Denver, CO 80225

NASA CASI Price Code Table

(Effective July 1, 1996)

CASI PRICE CODE	NORTH AMERICAN PRICE	FOREIGN PRICE
A01	\$ 6.50	\$ 13.00
A02	10.00	20.00
A03	19.50	39.00
A04-A05	21.50	43.00
A06	25.00	50.00
A07	28.00	56.00
A08	31.00	62.00
A09	35.00	70.00
A10	38.00	76.00
A11	41.00	82.00
A12	44.00	88.00
A13	47.00	94.00
A14-A17	49.00	98.00
A18-A21	57.00	114.00
A22-A25	67.00	134.00
A99	Call For Price	Call For Price

Important Notice

The \$1.50 domestic and \$9.00 foreign shipping and handling fee currently being charged will remain the same. Foreign airmail is \$27.00 for the first 1-3 items, \$9.00 for each additional item. Additionally, a new processing fee of \$2.00 per each video ordered will be assessed.

For users registered at the NASA CASI, document orders may be invoiced at the end of the month, charged against a deposit account, or paid by check or credit card. NASA CASI accepts American Express, Diners' Club, MasterCard, and VISA credit cards. There are no shipping and handling charges. To register at the NASA CASI, please request a registration form through the NASA Access Help Desk at the numbers or addresses below.

Return Policy

The NASA Center for Aerospace Information will gladly replace or make full refund on items you have requested if we have made an error in your order, if the item is defective, or if it was received in damaged condition and you contact us within 30 days of your original request. Just contact our NASA Access Help Desk at the numbers or addresses listed below.

NASA Center for Aerospace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934

E-mail: help@sti.nasa.gov
Fax: (301) 621-0134
Phone: (301) 621-0390

Federal Depository Library Program

In order to provide the general public with greater access to U.S. Government publications, Congress established the Federal Depository Library Program under the Government Printing Office (GPO), with 53 regional depositories responsible for permanent retention of material, inter-library loan, and reference services. At least one copy of nearly every NASA and NASA-sponsored publication, either in printed or microfiche format, is received and retained by the 53 regional depositories. A list of the Federal Regional Depository Libraries, arranged alphabetically by state, appears at the very end of this section. These libraries are not sales outlets. A local library can contact a regional depository to help locate specific reports, or direct contact may be made by an individual.

Public Collection of NASA Documents

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England for public access. The British Library Lending Division also has available many of the non-NASA publications cited in the STI Database. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents FIZ–Fachinformation Karlsruhe–Bibliographic Service, D-76344 Eggenstein-Leopoldshafen, Germany and TIB–Technische Informationsbibliothek, P.O. Box 60 80, D-30080 Hannover, Germany.

Submitting Documents

All users of this abstract service are urged to forward reports to be considered for announcement in the STI Database. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those you will transmit to NASA, DOD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to:

ATTN: Acquisitions Specialist
NASA Center for AeroSpace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934.

Reprints of journal articles, book chapters, and conference papers are also welcome.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on a public sale at the NASA Center for AeroSpace Information. Copyrighted publications will be announced but not distributed or sold.

Federal Regional Depository Libraries

ALABAMA

AUBURN UNIV. AT MONTGOMERY LIBRARY
Documents Dept.
7300 University Dr.
Montgomery, AL 36117-3596
(205) 244-3650 Fax: (205) 244-0678

UNIV. OF ALABAMA

Amelia Gayle Gorgas Library
Govt. Documents
P.O. Box 870266
Tuscaloosa, AL 35487-0266
(205) 348-6046 Fax: (205) 348-0760

ARIZONA

DEPT. OF LIBRARY, ARCHIVES, AND PUBLIC RECORDS
Research Division
Third Floor, State Capitol
1700 West Washington
Phoenix, AZ 85007
(602) 542-3701 Fax: (602) 542-4400

ARKANSAS

ARKANSAS STATE LIBRARY
State Library Service Section
Documents Service Section
One Capitol Mall
Little Rock, AR 72201-1014
(501) 682-2053 Fax: (501) 682-1529

CALIFORNIA

CALIFORNIA STATE LIBRARY
Govt. Publications Section
P.O. Box 942837 - 914 Capitol Mall
Sacramento, CA 94337-0091
(916) 654-0069 Fax: (916) 654-0241

COLORADO

UNIV. OF COLORADO - BOULDER
Libraries - Govt. Publications
Campus Box 184
Boulder, CO 80309-0184
(303) 492-8834 Fax: (303) 492-1881

DENVER PUBLIC LIBRARY

Govt. Publications Dept. BSG
1357 Broadway
Denver, CO 80203-2165
(303) 640-8846 Fax: (303) 640-8817

CONNECTICUT

CONNECTICUT STATE LIBRARY
231 Capitol Avenue
Hartford, CT 06106
(203) 566-4971 Fax: (203) 566-3322

FLORIDA

UNIV. OF FLORIDA LIBRARIES
Documents Dept.
240 Library West
Gainesville, FL 32611-2048
(904) 392-0366 Fax: (904) 392-7251

GEORGIA

UNIV. OF GEORGIA LIBRARIES
Govt. Documents Dept.
Jackson Street
Athens, GA 30602-1645
(706) 542-8949 Fax: (706) 542-4144

HAWAII

UNIV. OF HAWAII
Hamilton Library
Govt. Documents Collection
2550 The Mall
Honolulu, HI 96822
(808) 948-8230 Fax: (808) 956-5968

IDAHO

UNIV. OF IDAHO LIBRARY
Documents Section
Rayburn Street
Moscow, ID 83844-2353
(208) 885-6344 Fax: (208) 885-6817

ILLINOIS

ILLINOIS STATE LIBRARY
Federal Documents Dept.
300 South Second Street
Springfield, IL 62701-1796
(217) 782-7596 Fax: (217) 782-6437

INDIANA

INDIANA STATE LIBRARY
Serials/Documents Section
140 North Senate Avenue
Indianapolis, IN 46204-2296
(317) 232-3679 Fax: (317) 232-3728

IOWA

UNIV. OF IOWA LIBRARIES
Govt. Publications
Washington & Madison Streets
Iowa City, IA 52242-1166
(319) 335-5926 Fax: (319) 335-5900

KANSAS

UNIV. OF KANSAS
Govt. Documents & Maps Library
6001 Malott Hall
Lawrence, KS 66045-2800
(913) 864-4660 Fax: (913) 864-3855

KENTUCKY

UNIV. OF KENTUCKY
King Library South
Govt. Publications/Maps Dept.
Patterson Drive
Lexington, KY 40506-0039
(606) 257-3139 Fax: (606) 257-3139

LOUISIANA

LOUISIANA STATE UNIV.
Middleton Library
Govt. Documents Dept.
Baton Rouge, LA 70803-3312
(504) 388-2570 Fax: (504) 388-6992

LOUISIANA TECHNICAL UNIV.

Prescott Memorial Library
Govt. Documents Dept.
Ruston, LA 71272-0046
(318) 257-4962 Fax: (318) 257-2447

MAINE

UNIV. OF MAINE
Raymond H. Fogler Library
Govt. Documents Dept.
Orono, ME 04469-5729
(207) 581-1673 Fax: (207) 581-1653

MARYLAND

UNIV. OF MARYLAND - COLLEGE PARK
McKeldin Library
Govt. Documents/Maps Unit
College Park, MD 20742
(301) 405-9165 Fax: (301) 314-9416

MASSACHUSETTS

BOSTON PUBLIC LIBRARY
Govt. Documents
666 Boylston Street
Boston, MA 02117-0286
(617) 536-5400, ext. 226
Fax: (617) 536-7758

MICHIGAN

DETROIT PUBLIC LIBRARY
5201 Woodward Avenue
Detroit, MI 48202-4093
(313) 833-1025 Fax: (313) 833-0156

LIBRARY OF MICHIGAN

Govt. Documents Unit
P.O. Box 30007
717 West Allegan Street
Lansing, MI 48909
(517) 373-1300 Fax: (517) 373-3381

MINNESOTA

UNIV. OF MINNESOTA
Govt. Publications
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 624-5073 Fax: (612) 626-9353

MISSISSIPPI

UNIV. OF MISSISSIPPI
J.D. Williams Library
106 Old Gym Bldg.
University, MS 38677
(601) 232-5857 Fax: (601) 232-7465

MISSOURI

UNIV. OF MISSOURI - COLUMBIA
106B Ellis Library
Govt. Documents Sect.
Columbia, MO 65201-5149
(314) 882-6733 Fax: (314) 882-8044

MONTANA

UNIV. OF MONTANA
Mansfield Library
Documents Division
Missoula, MT 59812-1195
(406) 243-6700 Fax: (406) 243-2060

NEBRASKA

UNIV. OF NEBRASKA - LINCOLN
D.L. Love Memorial Library
Lincoln, NE 68588-0410
(402) 472-2562 Fax: (402) 472-5131

NEVADA

THE UNIV. OF NEVADA LIBRARIES
Business and Govt. Information Center
Reno, NV 89557-0044
(702) 784-6579 Fax: (702) 784-1751

NEW JERSEY

NEWARK PUBLIC LIBRARY
Science Div. - Public Access
P.O. Box 630
Five Washington Street
Newark, NJ 07101-7812
(201) 733-7782 Fax: (201) 733-5648

NEW MEXICO

UNIV. OF NEW MEXICO
General Library
Govt. Information Dept.
Albuquerque, NM 87131-1466
(505) 277-5441 Fax: (505) 277-6019

NEW MEXICO STATE LIBRARY

325 Don Gaspar Avenue
Santa Fe, NM 87503
(505) 827-3824 Fax: (505) 827-3888

NEW YORK

NEW YORK STATE LIBRARY
Cultural Education Center
Documents/Gift & Exchange Section
Empire State Plaza
Albany, NY 12230-0001
(518) 474-5355 Fax: (518) 474-5786

NORTH CAROLINA

UNIV. OF NORTH CAROLINA - CHAPEL HILL
Walter Royal Davis Library
CB 3912, Reference Dept.
Chapel Hill, NC 27514-8890
(919) 962-1151 Fax: (919) 962-4451

NORTH DAKOTA

NORTH DAKOTA STATE UNIV. LIB.
Documents
P.O. Box 5599
Fargo, ND 58105-5599
(701) 237-8886 Fax: (701) 237-7138

UNIV. OF NORTH DAKOTA

Chester Fritz Library
University Station
P.O. Box 9000 - Centennial and University Avenue
Grand Forks, ND 58202-9000
(701) 777-4632 Fax: (701) 777-3319

OHIO

STATE LIBRARY OF OHIO
Documents Dept.
65 South Front Street
Columbus, OH 43215-4163
(614) 644-7051 Fax: (614) 752-9178

OKLAHOMA

OKLAHOMA DEPT. OF LIBRARIES
U.S. Govt. Information Division
200 Northeast 18th Street
Oklahoma City, OK 73105-3298
(405) 521-2502, ext. 253
Fax: (405) 525-7804

OKLAHOMA STATE UNIV.

Edmon Low Library
Stillwater, OK 74078-0375
(405) 744-6546 Fax: (405) 744-5183

OREGON

PORTLAND STATE UNIV.
Branford P. Miller Library
934 Southwest Harrison
Portland, OR 97207-1151
(503) 725-4123 Fax: (503) 725-4524

PENNSYLVANIA

STATE LIBRARY OF PENN.
Govt. Publications Section
116 Walnut & Commonwealth Ave.
Harrisburg, PA 17105-1601
(717) 787-3752 Fax: (717) 783-2070

SOUTH CAROLINA

CLEMSON UNIV.
Robert Muldrow Cooper Library
Public Documents Unit
P.O. Box 343001
Clemson, SC 29634-3001
(803) 656-5174 Fax: (803) 656-3025

UNIV. OF SOUTH CAROLINA

Thomas Cooper Library
Green and Sumter Streets
Columbia, SC 29208
(803) 777-4841 Fax: (803) 777-9503

TENNESSEE

UNIV. OF MEMPHIS LIBRARIES
Govt. Publications Dept.
Memphis, TN 38152-0001
(901) 678-2206 Fax: (901) 678-2511

TEXAS

TEXAS STATE LIBRARY
United States Documents
P.O. Box 12927 - 1201 Brazos
Austin, TX 78701-0001
(512) 463-5455 Fax: (512) 463-5436

TEXAS TECH. UNIV. LIBRARIES

Documents Dept.
Lubbock, TX 79409-0002
(806) 742-2282 Fax: (806) 742-1920

UTAH

UTAH STATE UNIV.
Merrill Library Documents Dept.
Logan, UT 84322-3000
(801) 797-2678 Fax: (801) 797-2677

VIRGINIA

UNIV. OF VIRGINIA
Alderman Library
Govt. Documents
University Ave. & McCormick Rd.
Charlottesville, VA 22903-2498
(804) 824-3133 Fax: (804) 924-4337

WASHINGTON

WASHINGTON STATE LIBRARY
Govt. Publications
P.O. Box 42478
16th and Water Streets
Olympia, WA 98504-2478
(206) 753-4027 Fax: (206) 586-7575

WEST VIRGINIA

WEST VIRGINIA UNIV. LIBRARY
Govt. Documents Section
P.O. Box 6069 - 1549 University Ave.
Morgantown, WV 26506-6069
(304) 293-3051 Fax: (304) 293-6638

WISCONSIN

ST. HIST. SOC. OF WISCONSIN LIBRARY
Govt. Publication Section
816 State Street
Madison, WI 53706
(608) 264-6525 Fax: (608) 264-6520

MILWAUKEE PUBLIC LIBRARY

Documents Division
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 286-3073 Fax: (414) 286-8074

Typical Report Citation and Abstract

- ❶ **19970001126** NASA Langley Research Center, Hampton, VA USA
- ❷ **Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes**
- ❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
- ❹ Mar. 1996; 130p; In English
- ❺ Contract(s)/Grant(s): RTOP 505-68-70-04
- ❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
- ❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10° to 50°, and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65° swept forebody serrations tended to roll together, while vortices from 40° swept serrations were more effective in generating additional lift caused by their more independent nature.
- ❽ Author
- ❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

Key

1. Document ID Number; Corporate Source
2. Title
3. Author(s) and Affiliation(s)
4. Publication Date
5. Contract/Grant Number(s)
6. Report Number(s); Availability and Price Codes
7. Abstract
8. Abstract Author
9. Subject Terms

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 449)

OCTOBER 06, 1997

51

LIFE SCIENCES (GENERAL)

19970026074 Colorado Univ., Dept. of Physics, Boulder, CO USA

In Vitro Microtubule Growth for Producing Engineered Nanotransport Machines *Final Report, 1 Jun. 1996 - 31 Mar. 1997*

McIntosh, J. R., Colorado Univ., USA; Rogers, C. T., Colorado Univ., USA; Mar. 25, 1997; 4p; In English

Contract(s)/Grant(s): N00014-94-I-0621

Report No.(s): AD-A324884; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Methods have been developed for depositing patterned distributions of any antibody molecule on a SiO₂ wafer with high spatial definition and signal-to-noise ratio (Mooney et al., PNAS, 1996). This method is now being used to attach microtubule organizing centers (centrosomes) in patterned arrays to develop organized microtubule geometries of known polarity. In a parallel investigation, antibodies bound to glass have been used to attach chromosomes isolated from mammalian cells to a substrate for light microscopy. Stable microtubule fragments have then been bound to the chromosomes, elongated with rhodamine labeled tubulin, and their dynamics studied both by direct inspection and during intervention by a laser trap, holding a bead affixed to the chromosome distal end of the labile microtubule. Both chromosomes and centrosomes are examples of microtubule organizing centers with mechanical properties that can contribute to future work on engineered nanomachines.

DTIC

Antibodies; Biology; Photolithography

19970026096 Massachusetts Inst. of Tech., Cambridge, MA USA

Microbial Size Spectra from Diverse Marine Ecosystems

Gin, Karina Y., Massachusetts Inst. of Tech., USA; Jun. 1996; 363p; In English

Report No.(s): AD-A323873; MIT/WHOI-96-05; No Copyright; Avail: CASI; A16, Hardcopy; A03, Microfiche

Microbial size spectra serve as synoptic pictures of the organization of the pelagic food web. However, field data sets are limited and the range and variability of size spectra are still relatively unexplored. In this thesis, we examined how the characteristics of microbial size spectra varied with ecosystem productivity, and how size spectra responded to environmental perturbations. Flow cytometry was used to generate size spectra and to study the temporal and spatial dynamics of bacteria and phytoplankton from high nutrient, productive coastal waters in Massachusetts and Cape Cod Bays, and low nutrient, low productivity waters in the oligotrophic Sargasso Sea. Additional data was collected from the equatorial Pacific a high nutrient, low chlorophyll region. In general, a spectrum reflecting the predominance of larger bacteria and phytoplankton cells was observed in winter and early spring, where low temperatures resulted in well-mixed waters and high nutrient concentrations. Seasonal succession was accompanied by a distinct shift in the size spectrum to smaller cells, coinciding with rising temperatures, stratification of the water column and diminishing nutrient concentrations. In stratified waters, larger mean bacteria and phytoplankton sizes were observed in surface and very deep waters, whereas the smallest sizes were typically seen around the chlorophyll maximum.

DTIC

Microorganisms; Marine Environments; Ecosystems; Coastal Water; Bacteria; Phytoplankton

19970026181 East Carolina Univ., Dept. of Anatomy and Cell Biology, Greenville, NC USA

Effects of Space Flight on Ovarian-Hypophyseal Function in Postpartum Rats

Burden, H. W., East Carolina Univ., USA; Zary, J., East Carolina Univ., USA; Lawrence, I. E., East Carolina Univ., USA; Jonnalagadda, P., East Carolina Univ., USA; Davis, M., East Carolina Univ., USA; Hodson, C. A., East Carolina Univ., USA; *Journal of Reproduction and Fertility*; 1997; ISSN 0022-4251; Volume 109, pp. 193-197; In English

Contract(s)/Grant(s): NCC2-866

Report No.(s): NASA-CR-205092; NAS 1.26:205092; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The effect of space flight in a National Aeronautics and Space Administration (NASA) shuttle was studied in pregnant rats. Rats were launched on day 9 of gestation and recovered on day 20 of gestation. On day 20 of gestation, rats were unilaterally hysterectomized and subsequently allowed to go to term and deliver vaginally. There was no effect of space flight on pituitary and ovary mass postpartum. In addition, space flight did not alter healthy and atretic ovarian antral follicle populations, fetal wastage in utero, plasma concentrations of progesterone and luteinizing hormone (LH) or pituitary content of follicle stimulating hormone (FSH). Space flight significantly increased plasma concentrations of FSH and decreased pituitary content of LH at the postpartum sampling time. Collectively, these data show that space flight, initiated during the postimplantation period of pregnancy, and concluded before parturition, is compatible with maintenance of pregnancy and has minimal effects on postpartum hypophyseal parameters; however, none of the ovarian parameters examined was altered by space flight.

Author

Space Shuttles; NASA Programs; Pituitary Hormones; Ovaries; Rats; Pregnancy

19970026235 NASA Kennedy Space Center, Cocoa Beach, FL USA

Control of Growth and Development of Potato Plants

Poovaiah, Bachettira W., Inventor, NASA Kennedy Space Center, USA; Takezawa, Daisuke, Inventor, NASA Kennedy Space Center, USA; Han, Tae-Jin, Inventor, NASA Kennedy Space Center, USA; An, Gynheung H., Inventor, NASA Kennedy Space Center, USA; Mar. 12, 1996; 14p; In English

Patent Info.: Filed 30 Jul. 1993; NASA-Case-KSC-11736-1-CU; US-Patent-5,498,533; US-Patent-Appl-SN-100874; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A method of controlling growth and development of plants is provided herein. More particularly, a method of controlling growth and development of potato plants by increasing or decreasing the expression of a gene encoding calmodulin is set forth. Transgenic potato plants carrying sense nucleic acid constructs of pPCM-1, a cDNA clone of potato calmodulin, exhibit unexpected increased shoot and tuber growth, whereas plants carrying antisense nucleic acid constructs exhibit decreased shoot and tuber growth.

Author

Potatoes; Calmodulin; Plants (Botany)

19970026239 National Academy of Sciences - National Research Council, Committee on the Mathematics and Physics of Emerging Dynamic Biomedical Imaging, Washington, DC USA

Mathematics and Physics of Emerging Biomedical Imaging

1996; 262p; In English; Original contains color illustrations

Report No.(s): LC-95-72622; ISBN-0-309-05387-0; Copyright Waived; Avail: CASI; A12, Hardcopy; A03, Microfiche

Recent advances in imaging technology allow evaluation of biologic processes and events as they occur in vivo. For example, new magnetic resonance and radioisotope imaging methods reflect anatomy and dynamic body functions heretofore discerned only from textbook illustrations. These new methods give functional images of blood flow and metabolism essential to diagnoses and to research on the brain, heart, liver, kidneys, bone, and other organs of the human body.

Derived from text

Organs; Magnetic Resonance; Liver; Kidneys; Human Body; Heart; Brain; Anatomy

19970026244 Yale Univ., New Haven, CT USA

World Reference Center for Arboviruses, 9 Dec. 1993 - 8 Dec.1996

Rico-Hesse, Rebeca, Yale Univ., USA; Jan. 1997; 13p; In English

Contract(s)/Grant(s): DAMD17-94-J-4004

Report No.(s): AD-A325337; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper supported research of the World Reference Center for Arboviruses which: identifies and characterizes arboviruses, develops new techniques for rapid diagnosis and for characterization of arboviruses and arenaviruses and prepares and distributes reference immune reagents and specific PCR protocols and primers. Emphasis was placed on specific subprojects, which include: (1) nucleotide sequence analysis of flavivirus and arenavirus RNA for molecular epidemiological study of strains; (2) development of viral inactivating agents, for treatment of clinical samples, to render them non-hazardous; (3) use of the extensive reagent bank, to identify emerging viruses by antigenic and genetic methods, and (4) updating maintenance and cataloging methods for the virus collection.

DTIC

Epidemiology; Molecules; Viruses; Product Development

19970026255 NASA Ames Research Center, Moffett Field, CA USA

Feeding Frequency Affects Cultured Rat Pituitary Cells in Low Gravity

Hymer, W. C., Pennsylvania State Univ., USA; Grindeland, R. E., NASA Ames Research Center, USA; Salada, T., Pennsylvania State Univ., USA; Cenci, R., Pennsylvania State Univ., USA; Krishnan, K., Pennsylvania State Univ., USA; Mukai, C., National Space Development Agency, Japan; Nagaoka, S., National Space Development Agency, Japan; *Journal of Biotechnology*; 1996; ISSN 0168-1656; Volume 47, pp. 289-312; In English; American Society of Gravitational and Space Biology, 1995, Washington, DC, USA

Contract(s)/Grant(s): NCC2-370; NAG8-953

Report No.(s): NASA-CR-205103; NAS 1.26:205103; Copyright Waived (NASA); Avail: CASI; A03, Hardcopy; A01, Microfiche

In this report, we describe the results of a rat pituitary cell culture experiment done on STS-65 in which the effect of cell feeding on the release of the six anterior pituitary hormones was studied. We found complex microgravity related interactions between the frequency of cell feeding and the quantity and quality (i.e. biological activity) of some of the six hormones released in flight. Analyses of growth hormone (GH) released from cells into culture media on different mission days using gel filtration and ion exchange chromatography yielded qualitatively similar results between ground and flight samples. Lack of cell feeding resulted in extensive cell clumping in flight (but not ground) cultures. Vigorous fibroblast growth occurred in both ground and flight cultures fed 4 times. These results are interpreted within the context of autocrine and or paracrine feedback interactions. Finally the payload specialist successfully prepared a fresh trypsin solution in microgravity, detached the cells from their surface and reinserted them back into the culture chamber. These cells reattached and continued to release hormone in microgravity. In summary, this experiment shows that pituitary cells are microgravity sensitive and that coupled operations routinely associated with laboratory cell culture can also be accomplished in low gravity.

Author

Rats; Cells (Biology); Pituitary Gland; Microgravity; Frequencies; Ion Exchanging; Culture Techniques; Activity (Biology); Pituitary Hormones

19970026313 Centre Hospitalier Univ. Ranguel, Faculty of Medicine, Toulouse, France

In Vitro Interleukin-1 and 2 Production and Interleukin 2 Receptor Expression in the Rhesus Monkey

Schmitt, Didier A., Centre Hospitalier Univ. Ranguel, France; Sonnenfeld, Gerald, Carolinas Medical Center, USA; Husson, David, Centre Hospitalier Univ. Ranguel, France; Tkaczuk, Jean, Centre Hospitalier Univ. Ranguel, France; Andre, Eric, Pasteur (Louis) Univ., Niederhausbergen, France; Schaffar, Laurance, Institut National de la Sante et de la Recherche Medicale, France; *Life Sciences*; 1996; ISSN 0024-3205; Volume 59, No. 11, pp. 931-937; In English

Contract(s)/Grant(s): NAG2-933; CNES-91/297; CNES-92/315

Report No.(s): NASA-CR-203756; NAS 1.26:203756; Copyright Waived (NASA); Avail: CASI; A02, Hardcopy; A01, Microfiche

Anti-human monoclonal antibodies were used to detect and quantify interleukins-1 and 2 and interleukin-2 receptor expression in peripheral blood mononuclear cells from a rhesus monkey. Interleukin-1 production could be induced by phorbol esters (PMA) and was potentiated by phytohemagglutinin (PHA). Interleukin-2 secretion could also be induced by the combination of PHA and PMA, but only weakly with PHA alone. Interleukin-2 receptor expression was present in a subpopulation of unstimulated lymphocytes and could be enhanced by PHA or PMA. These data show once again that the rhesus monkey immune system is cross-reactive with the human one and that rhesus macaque could be a good model to study interleukin therapy.

Author

Monkeys; Immune Systems; Lymphocytes; Reactivity; Antibodies; Blood

19970026466 California Univ., San Francisco, CA USA

Effects of Hypogravity on Osteoblast Differentiation Final Report

Globus, Ruth, California Univ., USA; Doty, Steven, Hospital for Special Surgery, USA; 1997; 10p; In English

Contract(s)/Grant(s): NCC2-846

Report No.(s): NASA-CR-204527; NAS 1.26:204527; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Weightbearing is essential for normal skeletal function. Without weightbearing, the rate of bone formation by osteoblasts decreases in the growing rat. Defective formation may account for the decrease in the maturation, strength and mass of bone that is caused by spaceflight. These skeletal defects may be mediated by a combination of physiologic changes triggered by spaceflight, including skeletal unloading, fluid shifts, and stress-induced endocrine factors. The fundamental question of whether the defects in osteoblast function due to weightlessness are mediated by localized skeletal unloading or by systemic physiologic adaptations such as fluid shifts has not been answered. Furthermore, bone-forming activity of osteoblasts during unloading may

be affected by paracrine signals from vascular, monocytic, and neural cells that also reside in skeletal tissue. Therefore we proposed to examine whether exposure of cultured rat osteoblasts to spaceflight inhibits cellular differentiation and impairs mineralization when isolated from the influence of both systemic factors and other skeletal cells.

Author

Bone Mineral Content; Bones; Weightlessness; Musculoskeletal System

19970026489 NASA Ames Research Center, Moffett Field, CA USA

Experimental Modification of Rat Pituitary Prolactin Cell Function During and After Spaceflight

Hymer, W. C., Pennsylvania State Univ., USA; Salada, T., Pennsylvania State Univ., USA; Avery, L., Pennsylvania State Univ., USA; Grindeland, R. E., NASA Ames Research Center, USA; Prolactin and Spaceflight; 1996, pp. 971-980; In English
Contract(s)/Grant(s): NCC2-370; CA-23248

Report No.(s): NASA-CR-205105; NAS 1.26:205105; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Experimental modification of rat pituitary prolactin cell function during and after spaceflight. This study was done to evaluate the effects of microgravity on prolactin (PRL) cells of the male rat pituitary gland. We used the identical passive closed-vial cell culture system that was described for the culture of growth hormone cells (W C. Hymer, R. E. Grindeland, T. Salada, P. Nye, E. Grossman, and R Lane). After an 8-day spaceflight, all flight media (containing released PRL), as well as extracts (containing intracellular PRL), contained significantly lower amounts of immunoreactive PRL than their corresponding ground control samples. On the other hand, these same samples, when assessed for their biological activities by two different in vitro lymphocyte assays, yielded disparate results that may reflect posttranslational modifications to the hormone molecule. Other data showed that: (1) the apparent molecular weights of released PRL molecules were not altered by microgravity; but (2) the region from which the PRL cells came (dorsal or ventral) made a significant difference in the amount and activity of PRL released from the flight cells. Because there is much current interest in the role that PRL may play in the regulation of the immune system and because changes in both cellular and humoral immunity accompany spaceflight, this study could help define future microgravity research in this area.

Author

Microgravity; Cells (Biology); Pituitary Hormones; Rats; Pituitary Gland; Space Flight; Ground Based Control; Cytology; Culture Techniques; Assaying

19970026588 NASA Johnson Space Center, Houston, TX USA

Three-Dimensional Co-Culture Process

Goodwin, Thomas J., Inventor, NASA Johnson Space Center, USA; Wolf, David A., Inventor, NASA Johnson Space Center, USA; May 06, 1997; 5p; In English; Division of US-Patent-Appl-SN-939791, filed 3 Sep. 1992; continuation-in-part of US-Patent-Appl-SN-317931, filed 2 Mar. 1989; continuation-in-part of US-Patent-Appl-SN-213558, filed 30 Jun. 1988; continuation-in-part of US-Patent-Appl-Sn-213559

Patent Info.: Filed 17 Dec. 1993; NASA-Case-MS-C-21560-3; US-Patent-5,627,021; US-Patent-Appl-SN-170488; US-Patent-Appl-SN-939791; US-Patent-Appl-SN-317931; US-Patent-Appl-SN-213558; US-Patent-Appl-SN-213559; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

By the process of the present invention a variety of cells may be co-cultured to produce tissue which has 3-dimensionality and had some of the characteristics of in vivo tissue. The process provides enhanced 3-dimensional tissue which creates a multicellular organoid differentiation model.

Official Gazette of the U.S. Patent and Trademark

Cells (Biology); Tissues (Biology); Culture Techniques

19970026641 Istituto Superiore di Sanita, Rome, Italy

Chemical and Biological Contamination of Fish Products. Course held at the Istituto Superiore di Sanita, Rome, 1-2 June 1994 *Contaminazione Chimica e Biologica dei Prodotti della Pesca. Corso tenuto presso l'Istituto Superiore di Sanita. Roma, 1-2 giugno 1994*

Stacchini, Angelo, Editor, Istituto Superiore di Sanita, Italy; 1997; ISSN 1123-3117; 102p; In Italian

Report No.(s): ISTISAN-97/5; Copyright; Avail: Issuing Activity (Istituto Superiore di Sanita, Viale Regina Elena, 299-00161 Rome Italy), Hardcopy, Microfiche

The first contribution deals with chemical contaminants, particularly heavy metals and their acceptable daily intake (ADI). The following contributions deal with sanitary measures concerning biological contamination associated with the consumption of seafood, especially shellfish, taking into consideration the epidemiological relevance of some biological contaminants in Italy and Europe. Particular sanitary aspects concerning the presence of enteric viruses in mussels are presented; new molecular biology

methodologies and the different techniques for enteroviruses concentration are discussed. Some questions concerning the detection of algal biotoxins are shown, based on the experience recently acquired by the Istituto Superiore di Sanita about the biological methods. The current chromatographic methods for PSP and DSP biotoxin determination and the most recent developments in chemical methods based on liquid chromatography and mass spectrometric techniques are presented. The last section is devoted to the parasitic contamination of seafood.

Author

Contamination; Fishes; Biological Effects; Liquid Chromatography; Mass Spectroscopy; Molecular Biology

19970026648 Istituto Superiore di Sanita, Rome, Italy

Microbiological Methods in Food Control *Metodi di analisi per il controllo microbiologico degli alimenti*

DeMedici, Dario, Istituto Superiore di Sanita, Italy; Fenicia, Lucia, Istituto Superiore di Sanita, Italy; Orefice, Leucio, Istituto Superiore di Sanita, Italy; Stacchini, Angelo, Istituto Superiore di Sanita, Italy; 1996; ISSN 1123-3117; 117p; In Italian

Report No.(s): ISTISAN-96/35; Copyright; Avail: Issuing Activity (Istituto Superiore di Sanita, Viale Regina Elena, 299-00161 Rome, Italy), Hardcopy, Microfiche

The main analytical methods used by Istituto Superiore di Sanita for food microbiological control are reported. The handbook is composed of three different sections: a wide general introduction that explains the most important operations and procedures used in microbiological methods; the description of the microbiological methods according to different parameters; the composition of all media used in the above methods. Future editions containing revisions and integrations of the methods, due to the validation tests, are foreseen.

Author

Handbooks; Microbiology; Food; Procedures; Hygiene; Analyzing

19970026833 California Univ., Section of Neurobiology, Physiology, & Behavior, Davis, CA USA

Light and Gravity Effects on Circadian Rhythms of Rhesus Macaques *Final Report*

Fuller, Charles, California Univ., USA; [1997]; 21p; In English

Contract(s)/Grant(s): NAG2-801

Report No.(s): NASA-CR-204288; NAS 1.26:204288; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Temporal integration of a biological organism's physiological, behavioral and biochemical systems depends upon its circadian timing system. The endogenous period of this timing system is typically synchronized to the 24-hour day by environmental cues. The daily alternation of light and dark has long been known as one of the most potent environmental synchronizers influencing the circadian timing system. Alterations in the lighting environment (length or intensity of light exposure) can also affect the homeostatic state of the organism. A series of experiments was performed using rhesus monkeys with the objective of defining the fundamental properties of the circadian rhythm of body temperature. Three major experiments were performed in addition to several preliminary studies. These experiments explored 1.) the response of the rhesus body temperature rhythm to varying day length and light intensity; 2.) the response of the body temperature rhythm to light exposure as a function of time of day; and 3.) the characteristics of the metabolic heat production rhythm which is responsible for the daily cycle in body temperature. Results of these three completed experiments will be reported here. In addition, preliminary experiments were also performed in social entrainment of rhesus circadian rhythms and the properties of rhesus body temperature rhythms in constant conditions, where no external time cues were provided. Four adult male rhesus monkeys served as subjects in all experiments. All experiments were performed at the California Regional Primate Research Center. Each animal was implanted with a biotelemetry unit that measured deep body temperature. All surgeries were performed by a board certified veterinary surgeon under sterile conditions. The biotelemetry implants also provided an index of activity level in each animal. For metabolic heat production measurements, oxygen consumption and carbon dioxide production were measured and the caloric equivalent of these was calculated. Specific methodologies are described in detail.

Author

Circadian Rhythms; Gravitation; Exposure; Biochemistry; Organisms; Luminous Intensity

19970026857 University of Southern California, Los Angeles, CA USA

Bioluminescence and Symbiosis *Final Report*

Ruby, Edward G., University of Southern California, USA; May 1997; 5p; In English

Contract(s)/Grant(s): N00014-93-I-0846

Report No.(s): AD-A326308; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The objectives of this research are: (1) examine symbiotic competitive dominance in genetically distinct *Vibrio Fischeri*; (2) identify nonculturable but viable and symbiotically active *V. Fischeri* cells in seawater; (3) develop molecular genetic tools and

approaches in symbiotic strains of *V. Fischeri*; (4) identify the 'microecological' characteristics of the environment of the symbiotic squid light organ crypts using defined mutant strains *V. Fischeri*; and, (5) determine the identity of symbiotic bacteria from light organs of *Sepiolo* spp.

DTIC

Bioluminescence; Symbiosis; Bacteria

19970026869 Texas A&M Univ., College Station, TX USA

Luminescence-Based Biosensor Systems Final Report, 1 Sep. 1993 - 30 Sep. 1995

Baldwin, Thomas O., Texas A&M Univ., USA; Ziegler, Miriam M., Texas A&M Univ., USA; May 20, 1997; 6p; In English
Contract(s)/Grant(s): N00014-93-I-0991

Report No.(s): AD-A325692; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Progress has been made in two related areas during the period of this grant. In the area of luminescence-based biosensor systems, we have developed sensitive methods to detect antibiotics in biological materials and foods using bioluminescence. We believe that our methods can be automated and applied to the rapid detection of antibiotics in biological fluids, food sources, and other materials. In related studies, the crystal structure of bacterial luciferase has been determined at 2.4 Å resolution. This accomplishment represents a major step forward in our effort to understand this enzyme and how it works, including the details of its folding. Knowledge of the structure is crucial also to efforts to derivatize the enzyme for development of new generation biosensor systems.

DTIC

Bioluminescence; Detection; Bioinstrumentation; Antibiotics

19970026879 Texas Univ., Austin, TX USA

Investigation of the Solubility and Enzymatic Activity of a Thioredoxin-Gelonin Fusion Protein

Licata, Michael J., Texas Univ., USA; May 1997; 96p; In English

Report No.(s): AD-A325566; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

A synthetic gene for the Ribosome-Inactivating Protein (RIP), gelonin, was previously engineered and inserted into the pET-21a plasmid under the control of the T7 promoter by researchers at M.D. Anderson Cancer Research Institute in Houston, Texas. Upon induction of *Escherichia coli* (*E. coli*) strain BL-21(DE3)pLysS containing this pET-21a/gel plasmid, the resulting gelonin protein forms insoluble aggregates, known as inclusion bodies, and exhibits no activity under the assay conditions tested. by genetically fusing gelonin to the highly stable and soluble protein, thioredoxin, it was thought that there would be an increase in the solubility of gelonin, possibly accompanied by a measurable amount of enzymatic activity.

DTIC

Experimentation; Examination; Solubility; Enzyme Activity; Proteins; Escherichia

19970026892 Houston Univ., Dept. of Mechanical Engineering, TX USA

Bioreactor Mass Transport Studies Final Report

Kleis, Stanley J., Houston Univ., USA; Begley, Cynthia M., Houston Univ., USA; National Aeronautics and Space Administration (NASA)/American Society for Engineering Education (ASEE) Summer Faculty Fellowship Program: 1996; Jun. 1997; Volume 2; 20p; In English; Also announced as 19970026889; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

The objectives of the proposed research efforts were to develop both a simulation tool and a series of experiments to provide a quantitative assessment of mass transport in the NASA rotating wall perfused vessel (RWPV) bioreactor to be flown on EDU#2. This effort consisted of a literature review of bioreactor mass transport studies, the extension of an existing scalar transport computer simulation to include production and utilization of the scalar, and the evaluation of experimental techniques for determining mass transport in these vessels. Since mass transport at the cell surface is determined primarily by the relative motion of the cell assemblage and the surrounding fluid, a detailed assessment of the relative motion was conducted. Results of the simulations of the motion of spheres in the RWPV under microgravity conditions are compared with flight data from EDU#1 flown on STS-70. The mass transport across the cell membrane depends upon the environment, the cell type, and the biological state of the cell. Results from a literature review of cell requirements of several scalars are presented. As a first approximation, a model with a uniform spatial distribution of utilization or production was developed and results from these simulations are presented. There were two candidate processes considered for the experimental mass transport evaluations. The first was to measure the dissolution rate of solid or gel beads. The second was to measure the induced fluorescence of beads as a stimulant (for example hydrogen

peroxide) is infused into the vessel. Either technique would use video taped images of the process for recording the quantitative results. Results of preliminary tests of these techniques are discussed.

Author

Bioreactors; Space Transportation System Flights; Microgravity; Cells (Biology); Mass Transfer; Spatial Distribution

19970026896 Texas Univ., Dept. of Pathology, Galveston, TX USA

Influence of Zero-Shear on Yeast Development *Final Report*

McGinnis, Michael R., Texas Univ., USA; National Aeronautics and Space Administration (NASA)/American Society for Engineering Education (ASEE) Summer Faculty Fellowship Program: 1996; Jun. 1997; Volume 2; 8p; In English; Also announced as 19970026889; No Copyright; Avail: CASI; A02, Hardcopy; A02, Microfiche

The objective of the research was to begin evaluating the effect of zero-shear on the development of the cell wall of *Saccharomyces cerevisiae* employing the High Aspect Rotating-Wall Vessel (HARV) NASA bioreactor. This particular yeast has enormous potential for research as a model eukaryotic system on the International Space Station, as well as the production of food stuffs' at the future lunar colony. Because the cell wall is the barrier between the cell and the environment, its form and function as influenced by microgravity is of great importance. Morphologic studies revealed that the circularity and total area of the individual yeast cells were essentially the same in both the control and test HARV's. The growth rates were also essentially the same. In zero-shear, the yeast grew in clumps consisting of rudimentary pseudohyphae in contrast to solitary budding cells in the control. Based upon mechanical and sonic shear applied to the yeast cells, those grown in zero-shear had stronger cell walls and septa. This suggests that there are structural differences, most likely related to the chitin skeleton of the cell wall. From this research further NASA support was obtained to continue the work. Investigations will deal with gene expression and ultrastructure. These will lead to a clearer assessment of the value of *S. cerevisiae* eukaryotic as a model for space station research.

Author

Bioreactors; Cells (Biology); Eukaryotes; Gene Expression; International Space Station; Microgravity; Musculoskeletal System; Yeast; Saccharomyces

19970026932 Massachusetts General Hospital, Boston, MA USA

Cellular Analysis of Circadian Rhythmicity in Cultured SCN Neurons *Final Report, 1 Jul. 1993 - 30 Nov. 1996*

Reppert, Steven M., Massachusetts General Hospital, USA; Jan. 31, 1997; 3p; In English

Contract(s)/Grant(s): F49620-93-I-0434; AF Proj. 2312

Report No.(s): AD-A325695; AFOSR-TR-97-0146; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

In mammals, the biological clock that generates circadian rhythms is located in the suprachiasmatic nucleus (SCN) of the hypothalamus. A system for automated, long-term monitoring of circadian firing rhythms from multiple SCN neurons has been developed. In this dissociated culture system, cell interactions can be manipulated and individual rhythmic cells are accessible for further detailed study. With this system, single SCN neurons were shown to express circadian oscillations in firing rate for weeks. Despite abundant functional synapses, SCN neurons in the same culture expressed circadian rhythms of widely different phases, and even somewhat different circadian cycle lengths (periods). These data provide the strongest evidence to date that the SCN is composed of multiple circadian oscillators (clock cells).

DTIC

Circadian Rhythms; Neurons; Oscillations; Activity Cycles (Biology); Mammals; Nuclei (Cytology)

19970026948 Naval Health Research Center, Emerging Illness Team, San Diego, CA USA

Respiratory Pathogens of Military Importance: A Review *Final Report, Jan. - Mar. 1997*

Gray, Gregory C., Naval Health Research Center, USA; Mar. 1997; 21p; In English

Report No.(s): AD-A326214; NHRC-96-17; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Respiratory pathogens have been, and continue to be, a major cause of morbidity among military populations. This review describes the epidemiology, clinical manifestations and control strategies for the most commonly encountered bacterial and viral pathogens. *Streptococcus pyogenes*, *Streptococcus pneumoniae*, *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, influenza, and adenoviruses are examined. As these pathogens change and new threats emerge, military public health policy must adapt to meet these challenges.

DTIC

Clinical Medicine; Viruses; Respiratory System; Bacteria; Pathogens

19970026954 Washington State Univ., Pullman, WA USA

Regulated Expression of a Calmodulin Isoform Alters Growth and Development in Potato

Poovaiah, B. W., Washington State Univ., USA; Takezawa, D., Washington State Univ., USA; An, G., Washington State Univ., USA; Han, T.-J., Washington State Univ., USA; *Journal of Plant Physiology*; 1996; Volume 149, pp. 553-558; In English; Original contains color illustrations; Supported in part by the Agricultural Experiment Station.

Contract(s)/Grant(s): NAG10-0061; NSF DCB-91-04586; AES Proj. 0321

Report No.(s): NASA-CR-204748; NAS 1.26:204748; Copyright Waived (NASA); Avail: CASI; A02, Hardcopy; A01, Microfiche

A transgene approach was taken to study the consequences of altered expression of a calmodulin iso-form on plant growth and development. Eight genomic clones of potato calmodulin (PCM 1 to 8) have been isolated and characterized. Among the potato calmodulin isoforms studied, PCM 1 differs from the other isoforms because of its unique amino acid substitutions. Transgenic potato plants were produced carrying sense construct of PCM 1 fused to the CAMV 35S promoter. Transgenic plants showing a moderate increase in PCM 1 mRNA exhibited strong apical dominance, produced elongated tubers, and were taller than the controls. Interestingly, the plants expressing the highest level of PCM 1 mRNA did not form underground tubers. Instead, these transgenic plants produced aerial tubers when allowed to grow for longer periods. The expression of different calmodulin isoforms (PCM 1, 5, 6, and 8) was studied in transgenic plants. Among the four potato calmodulin isoforms, only the expression of PCM 1 mRNA was altered in transgenic plants, while the expression of other isoforms was not significantly altered. Western analysis revealed increased PCM 1 protein in transgenic plants, indicating that the expression of both mRNA and protein are altered in transgenic plants. These results suggest that increasing the expression of PCM 1 alters growth and development in potato plants.

Author

Amino Acids; Vegetation Growth; Potatoes

19970026967 Istituto Superiore di Sanita, Lab. di Tossicologia Comparata ed Ecotossicologia, Rome, Italy

Ecotoxicity tests based on phototactic behaviour in *Daphnia magna* Saggi di ecotossicita con *Daphnia magna* basati sul comportamento fototattico

DojmiDiDelupis, Gianluigi, Istituto Superiore di Sanita, Italy; 1997; ISSN 1123-3117; 18p; In Italian

Report No.(s): ISTISAN-97/10; Copyright; Avail: Issuing Activity (Istituto Superiore di Sanita, Viale Regina Elena, 299-00161 Rome, Italy), Hardcopy, Microfiche

Zooplankton behavior depending on light, such as phototaxis, is important, mainly in terms of its ecological significance, as, for example, in the role of phototaxis in the diurnal vertical migration of *Daphnia magna*, and its possible involvement in predator-prey relations. In *Daphnia magna* chemicals were found to induce roughly three types of phototaxis alteration: depression, enhancement and sign change. These phenomena are based on mechanisms that require further investigation. In spite of the complex photo behavior of *Daphnia magna* and the scarce knowledge of toxic effects, it was possible to set up rapid and easy ecotoxicity tests by fixing certain experimental conditions.

Author

Toxicity; Zooplankton; Arthropods

19970027212 Walter Reed Army Inst. of Research, Div. of Neuroscience, Washington, DC USA

Brief, High-Frequency Stimulation of the Corticomедial Amygdala Induces a Delayed and Prolonged Increase of Aggressiveness in Male Syrian Golden Hamsters

Potegal, M., Walter Reed Army Inst. of Research, USA; Hebert, M., Walter Reed Army Inst. of Research, USA; DeCoster, M., Walter Reed Army Inst. of Research, USA; Meyerhoff, J. L., Walter Reed Army Inst. of Research, USA; Jan. 1996; 15p; In English Report No.(s): AD-A309528; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Brief 200 Hz stimulation of the corticomедial amygdala increases the aggressiveness of male Syrian golden hamsters for a period of about 30 min; the effect peaks 10-15 min after stimulation. This effect is sensitive to both current level and, unexpectedly, stimulation frequency. Stimulation at the same parameters that reduce attack latency increases flank marking but has no effect on general activity or on the latency to copulate with a female. Immunocytochemical analysis suggests that stimulation effects may be coupled to c-fos expression and that unilateral stimulation has bilateral effects. The aggression-facilitating effects of CMZ stimulation appear to mimic part of the time course of behaviorally induced attack priming. These findings suggest that the temporal persistence of aggression may result from LTP-like changes within neural circuitry of which the CMA is a part.

DTIC

Nervous System; Adrenocorticotropin (ACTH); Stimulation; Corticosteroids; Physiological Effects

19970027218 Auburn Univ., Dept. of Botany and Microbiology, AL USA

Nongel Detection of PCR Amplicons Diagnostic of E. COLI, O157:H7: Potential for Use in Field Conditions

Shaw, Joe J., Auburn Univ., USA; Ramalka, Catherine A., Auburn Univ., USA; Hawkins, Leigh K., Auburn Univ., USA; Wu, Shaw-Jye, Auburn Univ., USA; Beninga, Kathy, Auburn Univ., USA; Mcleskey, Ferne K., Auburn Univ., USA; DelVecchio, Vito G., Scranton Univ., USA; May 1997; 11p; In English

Report No.(s): AD-A326236; AL/AO-TR-1997-0055; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Polymerase Chain Reaction (PCR) has provided powerful new strategies for the detection and identification of bacterial pathogens. We routinely use PCR-based methods to detect, identify, and study E. coli O157:H7 in our laboratory. Generally, after PCR, agarose gel electrophoresis is performed to visualize and characterize amplicons. However, amplicons of similar sizes cannot always be differentiated by electrophoretic methods, and spurious amplicons may occasionally be generated under multiplex PCR conditions. Southern hybridization methods can be employed to clear up ambiguities, but such measures can be laborious and time-consuming. We have used a rapid paper chromatography-based method, purchased in kit form (GeneComb, BIO RAD), to rapidly and easily analyze PCR-generated products. The method is based upon chromogenic detection of amplicons generated through the use of biotinylated primers, coupled with a brief (30 min.) chromatography step. This method allows complete clinical analysis of PCR amplicons in as little as one hour, providing positive identification of E. coli O157:H7. Multiple amplicons can be definitively detected depending upon the primers employed, the PCR conditions, and design of the chromatography step. We have used the method to easily, rapidly, and positively identify the 90-100 kb virulence plasmid of E. coli O157:H7, and to successfully differentiate between two similar-sized amplicons of the Shigella-like toxins (SLT 1 and SLT 2) of O157:H7 strains.

DTIC

Bacteria; Pathogens; Chromatography; Toxins and Antitoxins; Multiplexing; Electrophoresis

52

AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19970026187 Oak Ridge National Lab., Biomedical and Environmental Information Analysis Section, TN USA

Summary of Human Health Risk Assessment Guidelines and Methodologies Final Report, Dec. 1995 - Jul. 1996

Davidson, Kowetha A., Oak Ridge National Lab., USA; Sep. 1996; 80p; In English

Contract(s)/Grant(s): DE-AC05-96OR-22464

Report No.(s): AD-A325321; AL/OE-TR-1996-0176; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This report presents an overview of risk assessment guidelines and methodologies for evaluating cancer and noncancer hazards due to exposure to environmental substances. An overview of the National Research Council's 1994 report Science and Judgment in Risk Assessment has been included. Although other federal agencies have established risk assessment guidelines, this report focuses on guidelines and methodologies currently in use or currently proposed by the U. S. Environmental Protection Agency. The primary purpose of this report is to identify key issues pertinent to cancer and noncancer risk assessments that impact the risk assessment process and result in more plausible risk estimates.

DTIC

Health; Risk; Cancer; Environment Protection

19970026391 Institut Franco-Allemand de Recherches, Saint-Louis, France

Passive and Active Techniques for Hearing Protection

Dancer, A., Institut Franco-Allemand de Recherches, France; Buck, K., Institut Franco-Allemand de Recherches, France; Hamery, P., Institut Franco-Allemand de Recherches, France; Parmentier, G., Institut Franco-Allemand de Recherches, France; Jun. 1997; 10p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

The present state of passive and active techniques for hearing protection in the military environment is reviewed. Solutions which allow to protect the ear while preserving the operational abilities of the personnel (detection, localization, communication...) are especially emphasized.

Author

Noise Reduction; Ear Protectors; Auditory Perception; Armed Forces; Hearing; Voice Communication

19970026399 Royal Norwegian Air Force, Inst. of Aviation Medicine, Oslo, Norway

Effects of Active Noise Reduction on Noise Levels at the Tympanic Membrane

Wagstaff, A. S., Royal Norwegian Air Force, Norway; Woxen, O. J., Royal Norwegian Air Force, Norway; Jun. 1997; 6p; In English; Also announced as 19970026380; Sponsored in part by Norwegian Air Ambulance; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Active noise reduction (ANR) is an electronic system that works by continuous sampling of noise inside the earshell of the headset with a small microphone. This signal is inverted in phase through the headset speaker, thus reducing noise levels by destructive interference of the acoustic field. The system provides good low-frequency noise attenuation, but air crew differ in their subjective opinion of ANR. The present study is an attempt to provide an objective assessment of the effect of ANR on noise levels at the tympanic membrane. Seven subjects with normal ears were placed in an environment of recorded noise from a BO-105 helicopter. A microphone probe was inserted to within 5 mm of the tympanic membrane of each subjects right ear. Noise levels in the ear were measured without a headset and with two different ANR headsets. Measurements were performed with and without the ANR system on, and, with and without white noise through the headset communication system. The white noise was used to simulate aircraft communication noise. The two headsets tested had differing levels of passive and active attenuation. The ANR system produced a substantial low-frequency attenuation. However, noise levels in the mid frequencies increased somewhat when the ANR system was switched on. This effect was augmented when white noise in the communications system was introduced, particularly for one of the two headsets. Low-frequency noise attenuation of ANR systems is substantial, but an increased mid-and high frequency noise level caused by the ANR may affect both communication and overall noise levels. Our data provide advice on what factors should be taken into account when ANR is evaluated for use in an aviation operational environment.

Author

Aircraft Communication; Noise Reduction; Active Control; Acoustics; Continuous Noise; Earphones; Flight Crews; White Noise; Ear Protectors

19970026654 Iowa Univ., Dept. of Chemistry, Iowa City, IA USA

Chemical Sensor for Microscopic Mapping of Synaptic Glutamate Final Report

Arnold, Mark A., Iowa Univ., USA; Aug. 14, 1996; 8p; In English

Contract(s)/Grant(s): N00014-91-J-1768

Report No.(s): AD-A324706; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The overall goal of this research project is to develop an analytical procedure capable of measuring in situ extracellular glutamate levels in real-time during neurophysiological experiments. Such a system was successfully developed under this grant. This system is capable of measuring extracellular glutamate released from neurons following potassium evoked depolarization.

DTIC

Glutamates; Detection; Glutamic Acid; Real Time Operation

19970026658 Civil Aeromedical Inst., Oklahoma City, OK USA

Effects of Mild Hypoxia on Pilot Performances at General Aviation Altitudes Final Report

Nesthus, Thomas E., Civil Aeromedical Inst., USA; Rush, Ladonna L., Civil Aeromedical Inst., USA; Wreggit, Steven S., Civil Aeromedical Inst., USA; Apr. 1997; 43p; In English

Report No.(s): AD-A324719; DOT/FAA/AM-97/9; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

General aviation pilots may fly continuously at altitudes up to 12,500 ft. without the use of supplemental oxygen. However, hypoxia is a condition that can develop at altitudes under 12,500 ft. Research has shown highly variable tolerance and performance of individuals during low altitude laboratory exposures with simple and complex tasking. This study evaluated the physiological and subjective responses, as well as the simulated flight performance of general aviation pilots during a cross-country flight scenario. Ten pilots of a mild hypoxia group were compared with 10 pilots of a normoxic control group. Measurements of flight performance from the Basic General Aviation Research Simulator (BGARS) and of flight-following procedures were gathered during a 3-day, 2 hr. per day, cross-country flight scenario. Determined by group membership and terrain elevation during the cross-country flight, subjects breathed either oxygen mixtures simulating sea level, 8,000 ft., 10,000 ft., and 12,500 ft. altitudes or compressed air, throughout.

DTIC

Hypoxia; Physiological Responses; General Aviation Aircraft; Pilot Performance; Flight Simulation; Altitude

19970026867 Texas Univ. Health Science Center, School of Public Health, Houston, TX USA

A Public Health Approach to Evaluating the Significance of Air Ions

Kinne, Stephen M., Texas Univ. Health Science Center, USA; May 22, 1997; 91p; In English

Report No.(s): AD-A325580; AFIT-97-045; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

For greater than sixty years, controversy has surrounded the topic of air ions and their possible effects (both beneficial and adverse) on humans. Although many of the early studies were criticized for being flawed and results were frequently conflicting, the preponderance of them seemed to be in agreement that atmospheric (air) ions were at least active in biological systems. However, cause-effect relationships for human conditions or diseases were less conclusive and often contradictory. Unsubstantiated medical claims for ion generating devices and concern over ozone byproducts by from these machines led to the imposition of harsh marketing restrictions by the FDA in the early 1960's. As a result, serious interest in air ion research declined and has remained at relatively low levels in most scientific circles. Over the years, the technology and study designs have improved, but inconsistencies in findings have persisted. Despite this, a growing number of ion generating devices are being purchased, the sales undoubtedly influenced by fairly regular reports in the popular press about the health benefits of negative ions. Much of the scientific work in this field and the socioeconomic factors at work in the marketplace are unknown to most practicing health care providers. Yet, many will be asked to give professional opinions or advice on the use of these devices for various health reasons. This paper will explore air ions from the standpoint of a classic Public Health dilemma, and will present and use an epidemiological approach for judging a possible cause-effect relationship between air ions and health effects. A fairly inclusive bibliography is also offered as a resource for those wanting to explore particular aspects of the field in more depth.

DTIC

Public Health; Evaluation; Ions; Air; Significance; Ozone; Medical Services

19970026874 NASA Johnson Space Center, Houston, TX USA

Suppressed PHA Activation of T Lymphocytes in Simulated Microgravity is Restored by Direct Activation of Protein Kinase C with Phorbol Ester

Cooper, David, Texas Univ. Health Science Center, USA; Pellis, Neal R., NASA Johnson Space Center, USA; 1997; 40p; In English

Report No.(s): NASA-CR-204500; NAS 1.26:204500; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Various aspects of spaceflight, including microgravity, cosmic radiation, and physiological stress, may perturb immune function. We sought to understand the impact of microgravity alone on the cellular mechanisms critical to immunity. We utilized clinostatic RWV bioreactors that simulate aspects of microgravity to analyze the response of human PBMC to polyclonal activation. PHA responsiveness in the RWV was almost completely diminished. IL-2 and IFN-gamma secretion was reduced whereas IL-1 beta and IL-6 secretion was increased, suggesting that monocytes may not be as adversely affected by simulated microgravity as T cells. Activation marker expression (CD25, CD69, CD71) was significantly reduced in RWV cultures. Furthermore, addition of exogenous IL-2 to these cultures did not restore proliferation. Reduced cell-cell and cell-substratum interactions may play a role in the loss of PHA responsiveness. However, PHA activation in Teflon culture bags that limit cell-substratum interactions did not suppress PHA activation. Furthermore, increasing cell density and, therefore, cell-cell interactions in the RWV cultures did not help restore PHA activation. However, placing PBMC within small collagen beads did partially restore PHA responsiveness. Activation of both PBMC and purified T cells with PMA and ionomycin was unaffected by RWV culture, indicating that signaling mechanisms downstream of PKC activation and calcium flux are not sensitive to simulated microgravity. Furthermore, submitogenic doses of PMA alone but not ionomycin alone restored PHA responsiveness of PBMC in RWV culture. Thus, our data indicate that during polyclonal activation the signaling pathways upstream of PKC activation are sensitive to simulated microgravity.

Author

Antibodies; Space Flight; Physiology; Microgravity; Lymphocytes; Cytology; Cosmic Rays; Bioreactors

19970026894 Shenandoah Univ., Kinesiology Program, Winchester, VA USA

A Comparison of Total and Intrinsic Muscle Stiffness Among Flexors and Extensors of the Ankle, Knee and Elbow Final Report

Lemoine, Sandra M., Shenandoah Univ., USA; National Aeronautics and Space Administration (NASA)/American Society for Engineering Education (ASEE) Summer Faculty Fellowship Program: 1996; Jun. 1997; Volume 2; 12p; In English; Also announced as 19970026889; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

This study examined 3 methods that assessed muscle stiffness. Muscle stiffness has been quantified by tissue reactive force (transverse stiffness), vibration, and force (or torque) over displacement. Muscle stiffness also has two components: reflex (due to muscle sensor activity) and intrinsic (tonic firing of motor units, elastic nature of actin and myosin cross bridges, and connective

tissue). This study compared three methods of measuring muscle stiffness of agonist-antagonist muscle pairs of the ankle, knee and elbow.

Author

Transverse Oscillation; Activity (Biology); Connective Tissue; Flexors; Muscular Function; Stiffness

19970026928 Naval Postgraduate School, Monterey, CA USA

Bench Test Model of the Human Skull for Testing the Variable Frequency Pulse Phase-Locked Loop Instrument

Burin, Amy D., Naval Postgraduate School, USA; Dec. 1996; 137p; In English

Report No.(s): AD-A326412; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The Variable Frequency Pulse Phase-Locked Loop (VFPLL) instrument is currently being used to non-invasively evaluate the human skull for increases in intracranial distances brought about by increases in intracranial pressure. It is designed to determine distance changes, in the sub-micron range, calculated from changes in frequency of an ultrasonic toneburst produced by a transducer, traversed through the skull and received back by the transducer. A bench test model of the human skull will calibrate the VFPLL by comparing known distance changes to the VFPLL derived distance changes, and thereby verify the accuracy of the instrument. Additionally, the bench test model will determine a broad range of operating limits on temperature, pressure and elongation over which the VFPLL can operate accurately. Each of the three models made demonstrates a different effect on the frequency change based on the different parameters, i.e. temperature, pressure or elongation. The Open Channel Model compares closely approximated elongations with VFPLL derived elongations, showing favorable results for calibration of the VFPLL instrument. Specifications for creating a bench test model of the human skull for testing the VFPLL instrument are established in this thesis.

DTIC

Scale Models; Skull

19970026962 Naval Health Research Center, San Diego, CA USA

A Physical Training Program to Reduce Musculoskeletal Injuries in US Marine Corps Recruits, 1.0 Final Report, 1 Oct. 1994 - 30 Sep. 1997

Almeida, Sandra A., Naval Health Research Center, USA; Williams, Karen M., Naval Health Research Center, USA; Shaffer, Richard A., Naval Health Research Center, USA; Luz, James T., Naval Health Research Center, USA; Badong, Elizabeth, Naval Health Research Center, USA; May 17, 1997; 59p; In English

Report No.(s): AD-A326216; NHRC-TD-97-2B; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Recruits at Marine Corps Recruit Depot (MCRD) San Diego are at risk for training-related musculoskeletal injuries due to their relatively low baseline fitness levels and the sudden increase in vigorous physical activity associated with boot camp training. The annual fiscal and operational costs of recruit musculoskeletal injuries at MCRD San Diego were estimated at \$16.5 million and 53,000 lost training days. Stress fractures were the single most costly injury, with an estimated annual cost in excess of \$5 million.

DTIC

Musculoskeletal System; Injuries; Physical Fitness

19970026970 Naval Health Research Center, Medical Information Systems and Operations Research Dept., San Diego, CA USA

EPISYS (Epidemiological Interactive System): User's Guide, 1.0

Jaeger, Jennifer A., Naval Health Research Center, USA; White, Martin R., Naval Health Research Center, USA; Show, Ivan T., Naval Health Research Center, USA; Dec. 10, 1996; 100p; In English

Report No.(s): AD-A326215; NAVHLTHRSCHC-TD-97-1A; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

The Epidemiological Interactive System (EPISYS) is a computerized program and database that enables researchers to rapidly access, analyze, and summarize large amounts of epidemiological data. This version of EPISYS contains inpatient hospitalization, demographic, and career history records for all Navy enlisted personnel on active duty between 1 January 1980 and 30 September 1994. The hospitalization data contained in EPISYS are obtained from the Naval Medical Information Management Center, Bethesda, Maryland, (formally the Naval Medical Data services Center) and is updated quarterly. Demographic, occupational, and other service history information is provided by the Navy Military Personnel Command in Washington, D.C.

DTIC

Epidemiology; Medical Services; Computer Programs; User Manuals (Computer Programs)

19970026971 Institute of Space Medico, Beijing, China

Space Medicine and Medical Engineering, Volume 9 *Hangtian Yixue yu Yixue Gongcheng*

Wei, J., Institute of Space Medico, China; Dec. 1996; 79p; In Mixed; Portions of this document are not fully legible
Report No.(s): PB97-142731; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

Contents include the following: A Space Ergonomic Data Base System with Dynamic Human Body Model (in English); Study on P300 of Selective Response to Visual Signals with Half to Half Probability (in English); Changes in Bone Noncollagenous Proteins and Bone Mineral Redistribution in Tail - Suspended Rats (in English); Selection of Fine Bifidobacterium by Flight Onboard Recoverable Satellite; The Utility of RAPD Markers for Detection of Tomato DNA Mutation Induced by Space Flight; A Preliminary Study on the Biological Effects of the High Energy Heavy Ions; A Study on Absorption of Microwave Radiation Energy by Rhesus Monkeys under Different Polarization Directions; A Study on Maximum Allowable Concentration of 3 - methylindole in Closed Environment; Effect of Vestibular Stimulation on Urinary Cortisol, Aldosterone and Arginine Vasopressin in Pilots; Development of A Small Biocabin for Recoverable Satellite; Development of an Automatic Storage and Transmission System for Blood Pressure Measurement; Assessment of Gz(+) Protection with a New Type Capstan Anti - G Equipment; Comparison of Diagnosis Values Among Different ECG Parameters on Myocardial Ischemia.

NTIS

Aerospace Medicine; Data Bases; Human Body; Human Factors Engineering

19970027221 Indiana Univ., Dept. of Speech and Hearing Sciences and Dept. of Psychology, Bloomington, IN USA

Perception of Complex Auditory Patterns *Final Report, 15 Sep. 1992 - 15 Oct. 1996*

Watson, Charles S., Indiana Univ., USA; Kidd, Gary R., Indiana Univ., USA; Apr. 1997; 11p; In English
Contract(s)/Grant(s): F49620-92-J-0506; AF Proj. 2313

Report No.(s): AD-A325611; AFOSR-97-01312TR; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The research includes experiments on the discrimination and identification of a variety of complex sounds including sequences of tones, spectrally shaped waveforms, gaussian noise samples, speech sounds, and familiar environmental sounds. These factors include stimulus uncertainty, the proportion of the total duration of a sound that is subject to change, the temporal location of a change within a sound, and the details of a sound's spectral-temporal structure.

DTIC

Auditory Signals; Waveforms; Random Noise; Sequencing; Noise (Sound); Hearing

53

BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

19970026186 Missouri Univ., School of Optometry, Saint Louis, MO USA

Spatial Disparity Effects on Reaction Times to Dual Auditory and Visual Stimuli

Harrington, Lawrence K., Missouri Univ., USA; May 07, 1997; 51p; In English

Report No.(s): AD-A325336; AFIT-97-030; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The purpose of this study was to more thoroughly determine how spatial disparity effects saccadic reaction times to dual, auditory and visual, stimuli. In addition I sought to find out how spatially disparate the stimuli could be while maintaining evidence for neural summation. I had the long term goal, once I had demonstrated the legitimacy of technique, of mapping fields of multisensory neural summation.

DTIC

Spatial Resolution; Visual Stimuli; Saccadic Eye Movements

19970026249 Civil Aeromedical Inst., Oklahoma City, OK USA

Review of Air Traffic Controller Selection: An International Perspective *Final Report*

Broach, Dana, Civil Aeromedical Inst., USA; Manning, Carol A., Civil Aeromedical Inst., USA; Jul. 1997; 30p; In English
Contract(s)/Grant(s): AAM-95-B-HRR-163

Report No.(s): DOT/FAA/AM-97/15; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report provides a review of research on air traffic controller selection in the USA, Germany, the UK, and Sweden. The development and validation of the multiple hurdle selection system used by the US Federal Aviation Administration (FAA) from 1976 through 1992 is described first. The computer-administered test battery that supplanted the second-stage screening conducted at the FAA Academy is discussed next. Work by Eipfeldt for the German Air Navigation Services at the Aerospace Re-

search Establishment (DLR) in Hamburg is reviewed. Job analysis, test battery development, and validation research for the controller occupation in the UK is presented next, followed by a description of the Swedish 'MRU Project' on controller selection. The report closes with a discussion of issues surrounding controller job performance measurement. The advantages and disadvantages of historical criteria, such as training records, are reviewed. Alternative approaches to job performance measurement, such as simulations and operational data replay and analysis, are then described. The report closes with suggestions for future directions in controller selection research.

Author

Air Traffic Controllers (Personnel); Human Performance; Education; Air Navigation

19970026328 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA

Environmental Attitudes and Behaviors: An Examination of the Antecedents of Behavior Among Air Force Members at Work

Laudenslager, Mark S., Air Force Inst. of Tech., USA; Dec. 1996; 269p; In English

Report No.(s): AD-A325144; AFIT/GEE/ENV/96D-11; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

A questionnaire was randomly distributed to members of the USA Air Force at Wright Patterson AFB, OH, with 307 returned. The survey was designed to test the Theory of Planned Behavior (TPB) model developed by Icek Ajzen, and the Organizational Theory of Planned Behavior (OTPB) model explored in this research effort. Validation and measurement of the TPB in relation to an organizational setting was accomplished, with the OTPB developed. The behaviors and intentions individuals have towards recycling, energy conservation, and carpooling were examined, with the demographic variables of gender, age, and education also investigated. Regression analysis revealed that the TPB is supported by this research, while the OTPB is not well supported. However, the organizational commitment component of the OTPB does account for significant variance, and seems to support a portion of the OTPB. The demographic variables of gender, age, and education provide useful insight into the organization. Women show a greater tendency to carpool to work than men, and are more likely to participate in the behavior. Also, having some college education influences energy conservation behavior, energy conservation intention, and carpooling behavior at work. It was also shown that those who are older have a greater tendency to conserve energy at work, and are more likely to participate in the behavior.

DTIC

Flying Personnel; Energy Conservation; Air Pollution; Data Acquisition

19970026347 Federal Aviation Administration, William J. Hughes Technical Center, Atlantic City, NJ USA

The Development and Evaluation of a Behaviorally Based Rating Form for Assessing Air Traffic Controller Performance

Sollenberger, Randy L., Federal Aviation Administration, USA; Stein, Earl S., Federal Aviation Administration, USA; Gromelski, Stan, Federal Aviation Administration, USA; Feb. 1997; 60p; In English

Report No.(s): AD-A324727; DOT/FAA/CT-TN96/16; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The evaluation of air traffic controller performance is a complex process. While there are standard forms in field use, there is currently no comprehensive system for reliable observer evaluation. This research involves the development of a new form along with a training package for use in research and possibly operational testing. The form consists of 24 rating scales. These scales focus on observable actions that trained air traffic control specialists could identify to make behaviorally based ratings. The study evaluates the reliability of the rating form by determining the consistency of ratings obtained from six observers who viewed videotapes of a previously recorded simulation study. These observers were supervisors and training staff specialists from Terminal Radar Approach Control facilities nationwide. Prior to making formal ratings, the observers participated in a training program designed to help them become proficient in observational rating. During the evaluation phase of the study, the observers viewed 20 one hour videotapes of controllers working different traffic scenarios. The results indicated that most of the rating scales had reasonable inter-rater reliabilities ranging from $r=.7$ to $r=.9$. The study also identified the performance areas that were more difficult for observers to evaluate consistently, possibly due to misunderstanding rating criteria or overlooking critical controller actions.

DTIC

Product Development; Air Traffic Controllers (Personnel); Evaluation; Human Performance

19970026383 Armstrong Lab., Noise Effects Branch, Wright-Patterson AFB, OH USA

The Effects of Spatial Auditory Preview on Visual Performance

Elias, Bartholomew, Armstrong Lab., USA; Jun. 1997; 8p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Since the auditory system is not spatially restricted like the visual system, spatial auditory cues can provide information regarding an object's position, velocity, and trajectory beyond the field of view. Recent studies (e.g., Perrott, Cisneros, McKinley,

& D'Angelo, 1995) have demonstrated performance benefits in static visual search tasks over large spatial extents when visual targets have been augmented with spatial auditory position cues. The benefits of spatial auditory display augmentation have also been demonstrated in applied settings such as airborne traffic collision avoidance systems (Begault, 1993). Research has also shown that spatial auditory displays are potentially useful for enhancing cockpit situational awareness and reducing visual workload in tactical aircraft operations (McKinley, et al., 1994). The research program described here adds to these initial findings regarding the utility of spatial auditory displays by demonstrating that visual displays can be augmented with dynamic spatial auditory preview cues that provide information regarding the relative position, velocity, and trajectory of objects beyond the field of view. In one experiment, the effects of a spatial auditory preview display were examined in a visual target aiming task. A moving sound source provided cues regarding the position and velocity of moving targets prior to their appearance on the visual display. By providing these spatial auditory preview cues, greater accuracy was achieved in the visual target aiming task. In a second experiment, dynamic spatial auditory cues presented through headphones conveyed preview information regarding target position, velocity, and trajectory beyond the field of view in a dynamic visual search task. The provision of spatial auditory preview cues significantly reduced response times to acquire and identify moving visual targets that traversed a cluttered display and significantly reduced error rates in target classification. These findings demonstrate that spatial auditory preview can augment visual displays and enhance performance in complex, dynamic task domains such as aviation.

Author

Display Devices; Audio Equipment; Cockpits; Collision Avoidance; Flight Operations; Visual Tasks; Auditory Perception; Auditory Signals

19970026390 Aeronautical Research Labs., Air Operations Div., Melbourne, Australia

The Abilities of Listeners to Localise Defence Research Agency Auditory Warnings

Martin, Russell L., Aeronautical Research Labs., Australia; Parker, Simon P. A., Aeronautical Research Labs., Australia; McAnally, Ken I., Aeronautical Research Labs., Australia; Oldfield, Simon R., Aeronautical Research Labs., Australia; Jun. 1997; 8p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

The Defense Research Agency (DRA) in collaboration with the Applied Psychology Unit at Cambridge University and the Institute of Sound and Vibration Research at Southampton University have designed a set of 12 auditory warnings for use in military aircraft. These warnings have recently been modified to extend their high-frequency content in an attempt to increase the accuracy with which they can be localized and therefore enhance their suitability for use in conjunction with a 3D audio display. We have evaluated the abilities of listeners to localize a sample of the original DRA auditory warnings and their high-frequency versions. Eight subjects localized broadband noise and five original warnings when presented from a loudspeaker at each of 40 locations ranging from -40 to +40 deg azimuth and -50 to +50 deg elevation in their frontal hemifields. Subjects were divided into two groups of four subjects each on an age basis: 22-28 year olds and 33-48 year olds. Consistent with the results of previous studies, an average localization error of about 5 deg was observed for a train of three 150 ms bursts of broadband noise for both age groups. Average localization errors for the five original auditory warnings, however, were much larger and varied from about 10 to 25 deg for the younger subjects and 15 to 30 deg for the older. Four subjects, aged from 23-39 years, then localized three modified versions of two of these original warnings. Of the three modification methods employed, only one (fine-structure doubling) produced stimuli that were localized more accurately than their original versions. The improvement in localization accuracy for stimuli modified by this method resulted primarily from an improvement in the accuracy with which the elevation of the stimulus could be determined.

Author

Military Aircraft; Auditory Perception; Warning Systems; Sound Localization; Audio Equipment; Display Devices; Voice Communication

19970026662 Institute for Human Factors TNO, Soesterberg, Netherlands

The effect of various methods for crosstraining on team performance Final Report Het effect van drie verschillende methoden voor crosstraining op het presteren van teams

Schaafstal, A. M., Institute for Human Factors TNO, Netherlands; Bots, M. J., Institute for Human Factors TNO, Netherlands; Feb. 05, 1997; 50p; In Dutch

Contract(s)/Grant(s): B96-036

Report No.(s): TM-97-B001; TD-97-0169; Copyright; Avail: Issuing Activity (Inst. for Human Factors TNO, Soesterberg, Netherlands), Hardcopy, Microfiche

The results shown in this paper are that the communication between team members is of utmost importance for a good performance of the team. The analysis of the differences between the various methods for crosstraining shows that explicit attention for the shared aspects of the tasks of various team members will lead to better team performance and to the use of more efficient com-

munication strategies. The manipulation of time pressure unfortunately did not result in interpretable results, and has possibly been overshadowed by a general practice effect. The effect of practice in the tasks of other team members is less clear and seems to result in performance improvement only after a short acquaintance period.

Derived from text

Human Performance; Teams; Visual Tasks; Workloads (Psychophysiology)

19970026747 Illinois Univ., The Graduate College, Urbana-Champaign, IL USA

Displays for Spatial Situation Awareness: The Use of Spatial Enhancements to Improve Global and Local Awareness

Davenport, Clark E., Illinois Univ., USA; May 1997; 91p; In English

Report No.(s): AD-A325599; AFIT-97-050; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

In order to study the effect of display configuration on the spatial awareness facet of Situation Awareness (SA), we modified three displays with visual spatial enhancements to study their effects on local awareness and guidance and on global spatial awareness. A 2D coplanar display, a 3D exocentric display, and a 3D immersed/2D plan view display were modified using object display enhancements and visual momentum techniques. Pilots flew each display in a simulated low level tactical environment. Pilots' tasks were to navigate by the most direct route possible between waypoints positioned in 3D space and avoid stationary air and ground hazards (local awareness and guidance tasks). Additionally, they had to detect and verbally locate the position of intruder aircraft relative to ownship (clock position, relative altitude, and distance) that appeared on the screen. They also judged if and where the intruder would cross ownship's flight path (front, behind, not crossing) and the intruder's altitude change (climbing, level, or descending) (the global spatial awareness tasks). Results showed the spatial enhancements were effective in increasing local and global spatial situation awareness but did not eliminate all of the costs associated with each display format. The discussion explores the benefits and remaining costs of each display format in the context spatial situation awareness.

DTIC

Display Devices; Spatial Marching; Knowledge; Psychomotor Performance; Flight Simulation; Psychological Effects; Spatial Distribution

19970026840 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA

A Study of Fatigue and Performance Considerations in Air Mobility Cargo Aircrews Flying Transatlantic Missions

Levin, Julian C., Air Force Inst. of Tech., USA; May 29, 1997; 33p; In English

Report No.(s): AD-A325703; AFIT-97-049; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The U.S. Air Force Air Mobility Command (AMC) is responsible for movement of supplies and personnel, air refueling operations and air evacuation operations throughout the world in support of the USA' national interest. Continued peacekeeping and humanitarian missions require a robust 'air-bridge' for deployment and resupply of US and multinational forces world-wide. AMC cargo aircrews flying missions departing from US bases for transatlantic destinations frequently endure long duty days. Take-offs from the home base often disrupt normal sleep patterns and landings at the destination may occur during the circadian nadir. AMC aircrews differ from ordinary shift-workers in that they fly irregular hours without time to adapt to a routine overnight schedule. to this disruption in normal sleep patterns transatlantic missions add the additional factor of a 5-6 hour phase shift in the normal circadian cycle. As noted by Luce, those workers not placed on stable shifts 'suffer' significantly more than regular shift workers. They experience greater disruption in body rhythms and the associated physiologic and psychologic effects. Air-crew sleep cycles have generally not been considered when scheduling these 'routine' missions. The recently released 'Scientific Review of Air Mobility Command Crew Rest Policy and Fatigue Issues' demonstrates the importance of reevaluation of current policies and the need for continued studies.

DTIC

Examination; Fatigue (Biology); Flight Crews; Personnel; Stress (Psychology)

19970026870 State Univ. of New York, Dept. of Psychology, Binghamton, NY USA

Psychophysics of Complex Auditory and Speech Stimuli Final Report, 1 Nov. 1992 - 31 Oct. 1996

Pastore, Richard E., State Univ. of New York, USA; Oct. 1996; 30p; In English

Contract(s)/Grant(s): F49620-93-I-0033; AF Proj. 2313

Report No.(s): AD-A325716; AFOSR-TR-97-0150; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The supported research provides a careful examination of the many different interrelated factors, processes, and constructs important to the perception by humans of complex acoustic signals, including speech and music. Traditional, solid psychophysical procedures were employed to systematically investigate perceptual interaction, grouping, and streaming as a function of physical and perceptual properties of stimuli. Models of stimulus interaction are being developed from research with simpler stimuli and tested with more complex stimuli, including speech. In addition, several cross validated scaling measures and procedures were

used to determine the multidimensional perceptual space for highly learned categories, identifying the critical underlying dimensions, the function of each dimension for every category, and the nature of interactions among dimensions. Results also were used to develop and evaluate prototype, exemplar, and threshold models for the underlying categorization process. The research provides a comprehensive picture of lower and higher level factors and processes which result in the perception of classes of complex auditory stimuli, including speech and music. In health, industry, and human factors, the evaluation of problems and the development of appropriate approaches to treatment are limited by the accuracy of our understanding of the basic, underlying processes. Therefore, the improved understanding of perceptual processes for auditory and speech stimuli which result from this research has significant implications for scientific and practical advances in all of these fields.

DTIC

Psychophysics; Speech Recognition; Auditory Stimuli

19970027061 Civil Aeromedical Inst., Office of Aviation Medicine, Oklahoma City, OK USA

Personality Characteristics of Pre/Post-Strike Air Traffic Control Applicants *Final Report*

Schroeder, David J., Civil Aeromedical Inst., USA; Dollar, Carolyn S., Civil Aeromedical Inst., USA; Jul. 1997; 13p; In English Report No.(s): DOT/FAA/AM-97/17; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The 16 Personality Factors (16PF) test has been routinely administered to personnel applying for Air Traffic Control Specialist (ATCS) positions within the Federal Aviation Administration for more than 3 decades. This study was designed to assess the relationship between personality characteristics of a group of post-strike applicants (1984) with data gathered in the late 1960s to early 1970s (Karson and O'Dell, 1974). Additionally, the comparisons provide a baseline with which to assess characteristics of the new controllers who will start to enter the workforce as the post-strike workforce begins to retire following the year 2000. Outcomes were consistent with previous findings, in revealing that female and male ATCS applicants are brighter than the average individual. When compared with the general population norms, the applicant groups are less anxious, report higher self-discipline, and are more emotionally stable. They are also more self-reliant and assertive. These characteristics appear to be ideally suited for applicants to an occupation that requires quick decision-making and calm, thoughtful responses during emergencies.

Author

Air Traffic Control; Air Traffic Controllers (Personnel); Personality Tests; Emergencies; Decision Making

19970027090 Johns Hopkins Univ., Wilmer Eye Inst., Baltimore, MD USA

Visual Perception of Self Motion *Final Report, 15 Mar. 1994 - 14 Mar. 1997*

Turano, Kathleen A., Johns Hopkins Univ., USA; May 19, 1997; 99p; In English

Contract(s)/Grant(s): F49620-94-I-0187; AF Proj. 2313

Report No.(s): AD-A325536; Rept-52-0595110; AFOSR-TR-97-0157; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

With the advent of sensory engineering, it may be possible to circumvent the problems of spatial-disorientation, increase efficiency, and/or improve performance in self motion tasks by the modification of visual information. As a first step to this end, the visual information necessary for optimal motion perception was explored. In one set of experiments, the effect of eye movements on the ability to perceive small speed or direction differences was investigated.

DTIC

Visual Perception; Motion Perception; Eye Movements; Ophthalmology

19970027225 Ohio State Univ., Dept. of Psychology, Columbus, OH USA

Visual Perception of 3-Dimensional Form from Different Types of Optical Deformations *Final Report, 1 Feb. 1993 - 31 Aug. 1996*

Todd, James T., Ohio State Univ., USA; Nov. 19, 1996; 7p; In English

Contract(s)/Grant(s): F49620-93-I-0116; AF Proj. 2313

Report No.(s): AD-A326225; AFOSR-97-0268TR; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The research performed during the past three years of AFOSR support has examined the abilities of human observers to determine an object's 3-D form from various types of optical information such as shading, texture, motion, binocular disparity, both individually and in combination. The results of this search provide strong evidence that our perceptual representations of 3-D metrical properties are surprisingly inaccurate and imprecise, but that observers are quite good at judging ordinal or nominal relations among different surface regions. We have also examined how these judgments are influenced by combining different types of optical information using both computer simulations and direct viewing of natural scenes.

DTIC

Computerized Simulation; Visual Perception; Judgments; Binocular Vision; Textures

19970027242 Army Aeromedical Research Lab., Fort Rucker, AL USA

Proceedings of the First Triservice Conference on Rotary-Wing Spatial Disorientation: Spatial Disorientation in the Operational Rotary-Wing Environment Final Report

Braithwaite, Malcolm G., Army Aeromedical Research Lab., USA; DeRoche, Shannon L., Army Aeromedical Research Lab., USA; Alvarez, Eduardo A., Army Aeromedical Research Lab., USA; Reese, Melisa A., Army Aeromedical Research Lab., USA; Apr. 1997; 142p; In English, 24-26 Sep. 1996, Fort Rucker, AL, USA; Sponsored by Army Medical Research and Materiel Command, USA

Contract(s)/Grant(s): DA Proj. 3M1-62787-A-879

Report No.(s): AD-A324991; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Several recent studies at the U.S. Army Aeromedical Research Laboratory (USAARL) and the U.S. Army Safety Center (USASC) have highlighted the significant contribution of Spatial Disorientation (SD) to helicopter accidents. In the U.S. Army the cost can be approximated at \$58M and 14 lives each year. Following some local training initiatives by USAARL and the U.S. Army School of Aviation Medicine (USASAM), the first Triservice Symposium on Spatial Disorientation in Rotary-Wing Operations was held from 24 September 1996 through 26 September 1996 at USASAM. This symposium sought to address three main areas: (1) the seriousness of the SD hazard; (2) current methods to control the hazard; and (3) the associated safety and risk management concerns. This report contains the proceedings of the symposium. The symposium was considered to be a success in raising the awareness of the impact of SD on rotary-wing flying operations in the aeromedical and safety communities of the services. It was clear that SD imposes a particular hazard to rotary wing operations which differs in many respects to that experienced by fixed wing operators. There was unanimous agreement that initiatives to overcome the problem must be made. In order to maintain the impetus established by the symposium and secure funding for the various initiatives, the report contains a memorandum detailing the important factors and makes recommendations for future activity in the area. Work is required in education, training, research, and equipment procurement. Control factors are discussed and recommendations made according to whether the approach should be solely directed towards the U.S. Army, or on a triservice basis.

DTIC

Disorientation; Aircraft Safety; Helicopters; Conferences; Aerospace Medicine; Physiological Factors

54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19970026093 Marshall Univ., Dept. of Anatomy, Huntington, WV USA

Functions of Proprioceptive Inputs in Normal and Perturbed Walking Final Report

Zill, Sasha N., Marshall Univ., USA; Aug. 31, 1996; 16p; In English

Contract(s)/Grant(s): N00014-93-I-0088

Report No.(s): AD-A324639; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The goal of our project is to incorporate principles of design and regulation of walking by biological sense organs into sensors for legged robots. Both animals and robots must utilize information from sensors in the limbs to adapt walking patterns to variations in the environment. During our last funding period we have: (1) examined how patterns of muscle activities and joint movements are changed when animals walk on surfaces in which the orientation of the gravitational vector is altered and (2) characterized the activities and effects of leg sensors that monitor the transition between the stance (foot on ground) and swing (foot lifted) phases of walking. These studies have shown that animals discretely adapt some elements of the walking pattern when the effect of the gravitational vector is changed. These adaptations most probably occur by using specific inputs from sense organs that detect load when a leg is placed on the ground. Further, the walking system uses inputs and local reflex mechanisms of joint angle receptors to insure that a stable base of support is maintained when a leg is lifted from the walking surface in swing. The latter types of sensory inputs may also be important in adjusting walking when the leg slips on an uneven or unstable substrate. These studies are forming the basis for our collaborative efforts with the group at Case Western Reserve University to incorporate our results into a functional controller for a robot leg.

DTIC

Robots; Sense Organs; Walking; Proprioception

19970026184 Army Aeromedical Research Lab., Fort Rucker, AL USA

U.S. Army's Aviation Life Support Equipment Retrieval Program *Final Report*

Voisine, Joel J., Army Aeromedical Research Lab., USA; Licina, Joseph R., Army Aeromedical Research Lab., USA; McEntire, B. J., Army Aeromedical Research Lab., USA; Apr. 1997; 50p; In English

Contract(s)/Grant(s): 30162787A878

Report No.(s): AD-A324959; USAARL-97-16; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In 1972, the U.S. Army Aeromedical Research Laboratory (USAARL) established the Aviation Life Support Equipment Retrieval Program (ALSERP). The purpose of this program is to evaluate the effectiveness of aviation protective equipment in an aircraft accident environment and to contribute to the improvement of this equipment through modification or development of new design criteria. Department of the Army Pamphlet 385-40, Army Accident Investigation and Reporting, requires all life support equipment which is in any way implicated in the cause or prevention of injury to be shipped to USAARL for analysis. The primary objectives of the ALSERP are: (1) to determine why aviation mishap occupant injuries were or were not received, and (2) to develop concepts and criteria for design improvements through the analysis of injuries and their correlation to retrieved aviation life support equipment.

DTIC

Accident Investigation; Aircraft Accidents; Life Support Systems; Injuries

19970026191 Istituto Superiore di Sanita, Lab. di Igiene Ambientale, Rome, Italy

Hygienic and Health Aspects of Drinking Water, No. 1 *Aspetti Igienico-Sanitari Delle Acque Destinate al Consumo Umano*

Funari, Enzo, Editor, Istituto Superiore di Sanita, Italy; Ottaviani, Massimo, Editor, Istituto Superiore di Sanita, Italy; Mar. 1997; ISSN 1123-3117; 183p; In Italian

Report No.(s): ISTISAN-97-9; Copyright; Avail: Issuing Activity (Istituto Superiore di Sanita, Viale Regina Elena, 299-00161 Roma, Direttore Reggente: Aurelia Sargentini, Tel. 06/49901), Hardcopy, Microfiche

The quality of drinking water is a rather complex issue and involves various disciplines. To adequately treat this problem, it is necessary to use an integrated approach. The normative aspects of the problem of drinking water are reported, indicating, in particular, the perspectives included in the recent EEC proposal. Some of the main aspects of the risk to human health associated with the possible exposure, through drinking water, to chemical substances (carcinogenic and non carcinogenic), and biological agents (bacteria, viruses, algae, micro and macroinvertebrates) are presented. Finally, some aspects of risk management are examined in order to indicate the preventive and control measures necessary to ensure the quality of drinking water (abstraction techniques, treatment processes, protection of groundwater).

Author

Potable Water; Water Treatment; Health; Viruses; Carcinogens; Bacteria; Ground Water

19970026205 Syracuse Univ., Inst. for Sensory Research, NY USA

Design and Implementation of the Tactor Array Controller Tool *Final Report*

Bolanowski, Stanley J., Syracuse Univ., USA; Feb. 08, 1996; 19p; In English

Contract(s)/Grant(s): N00014-95-I-0526

Report No.(s): AD-A325173; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Basically, the project was a one time contract to design and build a specific piece of equipment to show feasibility of a system that would improve situational awareness for pilots and other Navy personnel whose sensory systems are overtaxed or receiving conflicting information. The primary interest in developing such a device for the Navy is to aid in decreasing the number of aircraft and pilots lost during warfare and while flying under conditions that corrupt situational awareness. Our portion of the project involved hardware and software design of a device to interface between the output of a gyroscope and the input to a tact or array. The tactor array consisted of tactors that are mounted on a body suit which the pilot wears. The gyroscopic information is fed into the controller which uses a lookup table, programmable via Labview software and located in Read Only Memory (ROM), to map orientation of the gyroscope to particular patterns of vibration in the tactor array. The device has been designed and built and sent to the Naval Air Medical Research Laboratory in Pensacola, FL, and was to be used in a test flight sometime in the middle of August, 1995.

DTIC

Design Analysis; Arrays; Feasibility; Flight Safety; Physiological Effects; Disorientation; Human-Computer Interface

19970026215 Army Aeromedical Research Lab., Fort Rucker, AL USA

Image Quality Figures of Merit for Contrast in CRT and Flat Panel Displays *Final Report*

Klymenko, Victor, Army Aeromedical Research Lab., USA; Harding, Thomas H., Army Aeromedical Research Lab., USA;

Martin, John S., Army Aeromedical Research Lab., USA; Beasley, Howard H., Army Aeromedical Research Lab., USA; Rash, Clarence E., UES, Inc., USA; Rabin, Jeff C., UES, Inc., USA; Apr. 1997; 43p; In English
Contract(s)/Grant(s): Proj. 3M162787A879

Report No.(s): AD-A325238; USAARL-97-177; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The image quality figure of merit of contrast is defined, explained, and discussed as applied to both cathode ray tube (CRT) and flat panel displays (FPDs). Currently acceptable requirements are discussed for both panel mounted and helmet mounted displays. The relationship between physical contrast and the human visual system also is discussed.

DTIC

Cathode Ray Tubes; Flat Panel Displays; Human Factors Engineering

19970026228 North Carolina Agricultural and Technical State Univ., Div. of Research, Greensboro, NC USA

Effectiveness of Variable Ventilation on Indoor Air Quality Final Report, 27 Sep. 1993 - 31 Dec. 1996

Singh, H., North Carolina Agricultural and Technical State Univ., USA; Jones, J., North Carolina Agricultural and Technical State Univ., USA; Rojeski, P., North Carolina Agricultural and Technical State Univ., USA; Mar. 26, 1997; 50p; In English

Contract(s)/Grant(s): DAAH04-93-2-0018

Report No.(s): AD-A325326; ARO-32488.1-EG-ISP; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Ventilation is a method of maintaining good Indoor Air Quality (IAQ). Demand controlled ventilation is a new control strategy that potentially improves IAQ while minimizing energy costs. However, there are several unanswered questions concerning the application of DCV. For example, how well do current CO₂ sensors perform? Under what conditions is DCV cost beneficial? Where is the sensor placement location that results in the highest IAQ. These questions were answered as part of this research program.

DTIC

Ventilation; Air Quality; Indoor Air Pollution

19970026234 Clemson Univ., SC USA

The Effects of Status, Cost, and Authoritarianism on Subordinate's Challenging/Monitoring Behavior in a Cockpit Simulation

Carey, Sean K., Clemson Univ., USA; Apr. 16, 1997; 109p; In English

Report No.(s): AD-A323878; AFIT/CI-97-014; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This research examined the challenging/monitoring communications behavior of 60 college undergraduates fulfilling the role of copilot in a cockpit simulation. The status of the pilot and cost of not challenging/monitoring the pilot's performance were manipulated. The number of task relevant communications, timing of these communications, and type of communications made by the subjects and directed at the pilot were measured. A measure of authoritarianism was also accomplished by the subjects. The results showed a significant status by cost interaction for the number and timing of communications variables. Subjects paired with low status pilots were more aggressive in their communications behavior under conditions of high cost than low cost of not challenging/monitoring. Subjects paired with high status pilots were more aggressive under conditions of low cost than high cost of not challenging/monitoring. Also, subjects paired with low status pilots used more direct styles of communication than those paired with high status pilots. These findings imply that when a copilot is paired with a high status pilot who makes a serious mistake, he/she is least likely to be aggressive in challenging such an error. In other words, copilots are most passive when their input is needed the most. Such findings have training, performance and safety implications.

DTIC

Aircraft Pilots; Cockpits; Flight Simulation; Voice Communication; Cockpit Simulators

19970026392 Institut Franco-Allemand de Recherches, Saint-Louis, France

Active Hearing Protectors: New Developments and Measurement Procedures

Buck, K., Institut Franco-Allemand de Recherches, France; Parmentier, G., Institut Franco-Allemand de Recherches, France; Jun. 1997; 6p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

The need for active noise cancellation (ANC) hearing protectors in the armed forces is shown. A description of the systems that are actually commercially available and of the way that future systems may be designed is described. It is also presented, that the presently normalized evaluation procedures should be modified to suit better the new technology of active hearing protectors.

Author

Armed Forces; Noise Reduction; Ear Protectors; Hearing; Noise Injuries; Loudness; Sound Intensity; Human Factors Engineering

19970026393 Laboratoire de Medecine Aerospatiale, Bretigny-sur-Orge, France

Laboratory Evaluation of Hearing Aid Developed for Combat Aviation *Evaluation en Laboratoire de Protheses Auditives Developpees pour l'Aviation de Combat*

Clere, J. M., Laboratoire de Medecine Aerospatiale, France; Ossard, C., Laboratoire de Medecine Aerospatiale, France; Grateau, P., Grateau (P.), France; Reynaud, G., Sextant Avionique, France; Jun. 1997; 8p; In French; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Man-machine dialogue is improved by the installation of new systems (viewfinder) on head-mounted equipment (helmet, mask, etc.). These systems make the equipment heavier and even render it dangerous due the Load factor. to make head-mounted equipment lighter, it was contemplated that one might replace the earphones with hearing aids, in other words, 'ear plugs' of lesser weight equipped with miniature transducers for the transfer of phonic messages.

Transl. by Schreiber

Helmets; Audio Equipment; Earphones; Human Factors Engineering; Weight (Mass); Voice Communication

19970026394 Mainz Univ., Inst. of Occupational-, Social- and Environmental Medicine, Germany

Impaired Noise-Attenuation of Aircrew Helmets and Headsets for Cockpit Personnel Who Wear Glasses

Rose, D.-M., Mainz Univ., Germany; Welsch, H., Institute of Aviation Medicine, Germany; Pongratz, H., Institute of Aviation Medicine, Germany; Konietzko, J., Mainz Univ., Germany; Jun. 1997; 4p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A01, Hardcopy; A03, Microfiche

Goggles significantly reduce the noise attenuation provided by hearing protection. The alteration of noise attenuation in 3 different helmets and one headset with 4 different spectacles was the object of this investigation. Sound pressure levels were measured inside the auditory canals of 11 candidates who were exposed to pink noise of 104 dB(lin) SPL with and without wearing the different types of spectacles and helmets. The mean noise attenuation of the headset and the helmet No 1 with separate ear-cuffs (SPH-4) was reduced in the mean up to 6 dB by glasses with thick horn-rimmed frames and less by glasses with thin metal frames. Helmets No 2 and No 3 (HGU-55 and an integrated helmet) provided only poor noise protection, but there was no further reduction of noise attenuation by wearing glasses. Headsets and helmets with separate ear-cuffs provided good noise protection. The reduction of noise attenuation with spectacles is significant depending on the thickness of the ear-piece. Thick horn-rims could potentially increase the risk of hearing impairment. If noise attenuation values are already poor (integrated helmet) glasses will not change the values much. to avoid hearing damage, only spectacles with thin frames should be worn by aircrews. In addition the visual field will also be enlarged.

Author

Noise Reduction; Earphones; Flight Crews; Goggles; Helmets; Design Analysis; Ear Protectors; Noise Injuries

19970026395 Naval Aerospace Medical Research Lab., Pensacola, FL USA

The Application of a Proprietary Sound-Attenuating Technology to Passive Circumaural Hearing Protector Design

Thomas, G. B., Naval Aerospace Medical Research Lab., USA; Maxwell, D. W., Naval Aerospace Medical Research Lab., USA; VanDyke, P. R., Naval Aerospace Medical Research Lab., USA; Jun. 1997; 6p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

The USA Navy recently patented (U.S. Patent #5,400,296 296) a composite technology that significantly improves a base materials ability to attenuate acoustical energy, particularly low-frequency acoustical energy. Given our success in applying the technology to components used by the transportation industry, we decided to investigate the feasibility of applying the technology to materials useful in the fabrication of circumaural hearing protectors. The proprietary technology is based on maximizing characteristic acoustic impedance differences between the constituents of the composite material. Because each base material used in the construction of the various components comprising a circumaural earcup assembly generally possesses a different inherent characteristic acoustic impedance, specific composite formulas had to be derived for each component material. That is, empirically derived formulas were required for the earcup shell material (i.e., epoxy resin), the ear seal material (i.e., silicone rubber), the ear seal filler (i.e., silicone gel), and requisite adhesives (i.e., silicone sealers). Hearing protector components were fabricated, then modified if necessary, based on results from flat plate coupler tests. Concentrating on noise frequencies below 125 Hz, we were able to fabricate earcup components that were generally superior in noise attenuation to those currently in standard use. In some instances, performance on the flat plate coupler yielded attenuation gains (relative to standard issue hearing protectors) of about 20 dB (at 31.5 Hz, for example). Gains on human models below 125 Hz are in the 9-15 dB range. The weak link in the earcup assembly remains the traditionally problematical ear seal (and the inverse

relationship between noise-attenuation effectiveness and user comfort and acceptance). New materials and designs are being investigated to optimize this component.

Author

Composite Materials; Ear Protectors; Noise Reduction; Design Analysis; Fabrication; Acoustic Attenuation; Human Factors Engineering

19970026396 Army Aeromedical Research Lab., Fort Rucker, AL USA

The Communications Earplug: A Logical Choice for Voice Communications in Aircraft

Mozo, Ben T., Army Aeromedical Research Lab., USA; Ribera, John E., Brooke Army Medical Center, USA; Audio Effectiveness in Aviation; Jun. 1997; 10p; In English; Also announced as 19970026380; Sponsored by Army Project Managers Office; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

The U.S. Army aviator works in high levels of noise and routinely faces the challenge of effective voice communication. Existing aviator helmets, while adequate in providing hearing protection, do not provide the signal-to-noise ratio necessary to optimize in-flight voice communications. The Communications Earplug (CEP) is a small device worn by the aviator and provides significant improvements in hearing protection and communication performance. The CEP uses a miniature earphone transducer adapted to a replaceable foam earplug. Attenuation characteristics of the CEP are similar to those of other insert hearing protective devices and provide adequate protection in U.S. Army noise environments. Additional protection results when the CEP is worn with the aviator's helmet. The CEP is comfortable over a period of several hours and, in its current configuration, is considered highly acceptable by seasoned aviators and crewmembers. The CEP is easier to insert and seat in the outer ear canal than other insert protectors available through military channels. Speech intelligibility in simulated helicopter noise is significantly enhanced when using the CEP when compared to the standard SPH-4 and HGU-56/P aviator's helmets. CEP and active noise reduction (ANR) results are comparable in terms of speech intelligibility. However, there are several differences that should be considered before deciding which is the system of choice. The technology developed for CEP has wide-ranging application in the military and can easily be adapted to communication needs in the civilian community. The CEP is an inexpensive device that can enhance air and ground crewmember voice communications in the operational environment, and should be positively considered for inclusion into all aircraft and vehicular communication helmets as a battlefield multiplier for the 21st century.

Author

Aircraft Pilots; Earphones; Voice Communication; Noise Reduction; Helmets; Active Control; Hearing; Ear Protectors; Auditory Perception; Audio Equipment

19970026397 Defence and Civil Inst. of Environmental Medicine, North York, Ontario Canada

Constraints in the Application of Personal Active Noise Reduction Systems

Crabtree, R. B., Defence and Civil Inst. of Environmental Medicine, Canada; Jun. 1997; 6p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Active Noise Reduction (ANR) systems built into personally-worn headsets and helmets, when properly designed and carefully fitted, have shown considerable potential for reducing noise exposure and improving the listening conditions under which auditory tasks are carried out in military operations. Performance limitations have been identified in certain devices, however. Some have a tendency to overload easily or to cease operating under adverse conditions, and others become unstable when the seal around the ear is broken. Recent findings indicate strongly that proper fitting around the ear is a functional necessity for satisfactory ANR operation. This is particularly true of units having a low tolerance to overloading and those which continue to operate in the infrasound frequency range. As a consequence, the function of any ANR system must be understood within the context of its intended operating environment in order to estimate whether the system will perform satisfactorily.

Author

Noise Reduction; Earphones; Ear Protectors; Hearing; Auditory Perception; Military Operations; Human Factors Engineering

19970026398 Centre d'Enseignement et de Recherches de Medecine Aeronautique, IMASSA, Bretigny, France

Assessment of Active Noise Reduction Hearing Protectors: Noise Attenuation and Speech Intelligibility *Evaluation de Casques a Reduction Active de Bruit: Protection Auditive et Intelligibilite*

Pellieux, L., Centre d'Enseignement et de Recherches de Medecine Aeronautique, France; Sarafian, D., Centre d'Enseignement et de Recherches de Medecine Aeronautique, France; Reynaud, G., Sextant Avionique, France; Jun. 1997; 20p; In French; Also announced as 19970026380; Copyright Waived; Avail: CASI; A03, Hardcopy; A03, Microfiche

Hearing protection offered by current pilot helmets is far to be fully satisfying as shown by the large number of hearing losses observed in military aviators at retirement age. Due to the poor intelligibility of communication channels the sound volume has to be significantly increased which adds a dangerous auditory stressor. Eight hearing protectors such as commercially available

active noise reduction (ANR) headsets and prototype helmets, equipped with ANR earshells, were assessed in order to estimate their efficacy for both noise attenuation and improvement on speech intelligibility. The assessment was based on original experimental protocols including abnormal conditions, objective measurement of both passive and active attenuations by the MIRE method, subjective prediction of intelligibility by measuring the Speech Transmission Index, and its subjective evaluation through CVC tests. Realistic jet and helicopter noisy environments and a pink noise have been used to perform the tests. The results obtained with the various systems assessed are presented and discussed.

Author

Noise Reduction; Aircraft Pilots; Hearing; Ear Protectors; Noise Injuries; Speech Recognition; Earphones; Auditory Fatigue

19970026400 Institute for Human Factors TNO, Soesterberg, Netherlands

Personal Active Noise Reduction with Integrated Speech Communication Devices: Development and Assessment

Steeneken, H. J. M., Institute for Human Factors TNO, Netherlands; Verhave, J. A., Institute for Human Factors TNO, Netherlands; Jun. 1997; 8p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Active noise reduction is a successful addition to passive eardefenders for improvement of the sound attenuation at low frequencies. Assessment methods are discussed, focused on subjective and objective attenuation measurements, stability, and on high noise level applications. Active noise reduction systems are suitable for integration with an intercom. For this purpose the intelligibility in combination with environmental noise is evaluated. Development of a system includes the acoustical design, the feedback amplifier, and the speech input facility. An example of such a development is discussed. Finally the performance of some commercial systems and a laboratory prototype are compared.

Author

Communication Equipment; Noise Reduction; Voice Communication; Acoustic Attenuation; Speech Recognition; Ear Protectors; Design Analysis

19970026401 National Research Council of Canada, Ottawa, Ontario Canada

Adaptive Active Noise Reduction Headset for Helicopter Aircrew

Pan, G. J., National Research Council of Canada, Canada; Brammer, A. J., National Research Council of Canada, Canada; Crabtree, R. B., Defence and Civil Inst. of Environmental Medicine, Canada; Jun. 1997; 6p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

The feasibility of applying adaptive active noise reduction (ANR) to a communication headset has been explored by applying digital feedforward control to a headset designed for helicopter aircrew. A miniature microphone was mounted on the outside of one circumaural earmuff to provide a reference signal, while the original microphone and earphone located within the volume enclosed by the earcup of a commercial ANR headset were retained to provide an 'error' signal and the corrective sound field, respectively. The signals were digitized and processed in real time by a TMS320C31 digital signal processor operating at 40 MHz. The performance of the apparatus has been evaluated in a reverberant room using a recording of Sea King helicopter noise at the aircrew position. The noise was replayed so as to reproduce the sound pressure levels measured in the helicopter during hover. Both noise spectrum and level were confirmed by one-third octaveband analysis. For active control, the helicopter noise was band-limited to from 10 to 1000 Hz. When tested on five subjects, the apparatus controlled the noise at the ear within this frequency range, and the control system was stable. The noise reduction recorded at the error microphone, i.e., close to the ear canal entrance, was in excess of 10 dB from 16 to 300 Hz for all subjects, and ranged from 10 to 26 dB at the rotor blade passage frequency (16 Hz), and from 10 to 20 dB at frequencies up to 200 Hz, depending on the subject. The differences in ANR experienced by the subjects are believed to be associated with variations in the fit of the headset, and remain the subject of continuing research.

Author

Feedforward Control; Digital Systems; Active Control; Noise Reduction; Aircraft Noise; Earphones; Flight Crews; Microphones; Real Time Operation; Signal Analyzers; Human Factors Engineering; Design Analysis

19970026402 Army Research Lab., Human Research and Engineering Directorate, Fort Monmouth, NJ USA

Effects of Active Noise Reduction in Armor Crew Headsets

Anderson, B. Wayne, Army Research Lab., USA; Garinther, Georges R., Army Research Lab., USA; Jun. 1997; 6p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

The armor environment, like that of aviation, makes communication difficult and often produces a hearing loss in the crewmembers. In an attempt to improve this situation, the Army is presently fielding tankers' helmets with Active Noise Reduction (ANR) as a part of the Vehicular Intercommunications System (VIS). A number of studies were conducted to evaluate the effectiveness of ANR for the armor environment. In-the-ear noise level measures were done and speech intelligibility tests conducted.

For armored vehicles producing noise levels of 114 dB(A), these helmets reduce the noise at the ear to 83 dB(A) when the inter-communication system is not keyed, 90 dB(A) when the system is keyed, and 94 dB(A) when the system is keyed with a person talking over the system. This is an improvement in noise reduction of about 17 dB(A) compared to the helmets presently being used. This improved noise attenuation has increased speech intelligibility from 68% to 89%. According to previous studies, such an improvement can be equated to a 25% increase in successfully accomplished armor missions. Incorporation of ANR into these helmets has increased low frequency attenuation by up to 13 dB above the passive attenuation of these helmets. At frequencies greater than 800 Hz, ANR does not provide any additional attenuation above the passive attenuation. The attenuation produced by these new helmets has increased the allowable daily exposure time in armored vehicles from 20 minutes to 12 hours.

Author

Noise Reduction; Active Control; Auditory Defects; Voice Communication; Earphones; Armor; Military Vehicles; Helmets; Speech Recognition

19970026403 Armstrong Lab., Bioacoustics and Biocommunications Branch, Wright-Patterson AFB, OH USA

Special Applications of Active Noise Reduction Headsets

McKinley, Richard L., Armstrong Lab., USA; Morris, Linda J., Armstrong Lab., USA; Nixon, Charles W., Armstrong Lab., USA; Jun. 1997; 4p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A01, Hardcopy; A03, Microfiche

The growth of Active Noise Reduction (ANR) headset technology has accelerated over the past five years. The applications for normal hearing listeners are extensive and the potential for use by persons with hearing loss is excellent. The primary goal of ANR headsets is to reduce the level of the noise at the ears thereby reducing the probability of noise induced effects on hearing and on voice communications. In November 1995, a specially modified ANR headset was demonstrated for users with varying degrees of hearing loss. Most ANR headset systems in operation today are used in aviation associated applications where many of the users have mild to moderate hearing loss. This paper describes the sound attenuation and speech communications performance of both normal and modified ANR headset technology with both normal and hearing impaired users. The limitations and advantages are discussed as well as what can be expected from both standard and modified ANR headset systems.

Author

Voice Communication; Noise Reduction; Earphones; Hearing; Auditory Perception; Acoustic Attenuation

19970026404 Psycho-Linguistic Research Associates, Menlo Park, CA USA

Active Noise Reduction Flight Tests in Military Helicopters

Simpson, Carol, Psycho-Linguistic Research Associates, USA; King, Robert, Defence Science and Technology Organisation, Australia; Jun. 1997; 18p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A03, Hardcopy; A03, Microfiche

US Army Aeroflightdynamics Directorate (AFDD), in collaboration with AS Aeronautical and Maritime Research Laboratory (AMRL), has conducted flight tests in a range of military helicopters to determine the potential benefit of active noise reduction (ANR) earcups developed by the UK's Defense Research Agency (DRA) for military aircrew. Test data include (a) acoustic attenuation characteristics, (b) speech intelligibility, (c) aircrew ratings of cockpit speech intelligibility, clarity, and attention demand for speech message recognition, and (d) ratings of the suitability of ANR for operational use. Test aircraft in which data were collected include American NAH-1S (Cobra), UH-1H (Huey), OH-58D (Kiowa), AH-64A (Apache), EH-60 (Blackhawk), and Australian S-70B-2 (Seahawk) and S-70A-9 (Black Hawk). Results show that the DRA ANR system effectively reduced the level of low frequency noise (less than 800 Hz) and reduced overall at-ear sound pressure levels (SPL's) by around 10 dB. Results also indicate that ANR substantially increases speech intelligibility, reduces the level of attention pilots must use to understand speech communications, works with onboard weapons firing noise, allows pilots to hear familiar audio cues necessary for aircraft situational awareness, and functions without failure in training and actual combat conditions. With the DRA ANR system, speech intelligibility meets the exceptionally high intelligibility criteria as defined in MIL-STD 1472 for operational systems, providing the speech intelligibility needed to ensure that pilots and soldiers communicate tactical information accurately.

Author

Acoustic Attenuation; Noise Reduction; Military Helicopters; Flight Crews; Ear Protectors; Speech Recognition; Flight Tests

19970026405 Salford Univ., Dept. of Acoustics and Audio Engineering, UK

Next Generation Active Noise Reduction Systems

Darlington, P., Salford Univ., UK; Rood, G. M., Defence Research Agency, UK; Jun. 1997; 6p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Active techniques for attenuating the sound pressure levels at the ears of aircrew are examined. Conventional Active Noise Reduction (ANR) systems are reviewed. Their performance is shown to be constrained by their essential 'feedback' architecture.

ANR systems which avoid the feedback path are introduced and the performance of a new active noise reduction system is reported. The new system is demonstrated to offer such attenuation of noise that hearing damage risk is significantly reduced and operational performance enhanced.

Author

Noise Reduction; Acoustic Attenuation; Sound Pressure; Hearing; Flight Crews; Auditory Fatigue; Ear Protectors

19970026406 Rigshospitalet, Dept. of Otolaryngology, Copenhagen, Denmark

Aircraft Noise Profiles and the Efficiency of Noise Protection Devices in the Royal Danish Air Force

Vesterhauge, S., Rigshospitalet, Denmark; Osterhammel, P. A., Rigshospitalet, Denmark; Rasmussen, A. Norby, Rigshospitalet, Denmark; Oldenburg, J. N. S., Royal Danish Air Force, Denmark; Jensen, E. S., Royal Danish Air Force, Denmark; Jun. 1997; 6p; In English; Also announced as 19970026380; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Except for being hazardous to the function of the ear itself, noise has a lot of unpleasant non-organic capabilities. It is annoying, noise interferes with performance and efficiency, and it interferes with communication. No matter what we do, we all have to live with and accept certain levels of noise. This, indeed, counts for aviation too. It has been told, that when Louis Bleriot in 1909 flew from France to England, the noise from his 25 HP engine heard from the ground by those fortunate enough to witness this historic event, was probably 20 to 30 dB louder than the noise reaching the ground from a current jet aircraft. This was caused by the fact that Bleriot flew very much lower than modern aircraft. So, due to simple physical laws, the closer you are to a noise source, the more you are exposed, and those closest to an aircraft are those working in it or outside the plane. In the air force and in other flying units of our defense, personnel is exposed to high levels of noise. The purpose of the present study, is simply to map, in a comparable way the noise impact on personnel working at different positions in relation to aircraft used by the Danish defense - to establish the efficiency of different noise protection devices used by personnel working at different positions - and finally to advise the proper authorities concerning the proper use of noise protection devices in order to avoid as much as possible the harmful effects of aircraft noise as described above.

Author

Aircraft Noise; Ear Protectors; Noise Reduction; Human Factors Engineering; Auditory Fatigue; Occupational Diseases

19970026476 Istituto Superiore di Sanita, Rome, Italy

Analytical Methods used in Food Chemical Control *Metodi di analisi utilizzati per il controllo chimico degli alimenti*

Baldini, Massimo, Editor, Istituto Superiore di Sanita, Italy; Fabietti, Fabio, Editor, Istituto Superiore di Sanita, Italy; Giammario-li, Stefania, Editor, Istituto Superiore di Sanita, Italy; Onori, Roberta, Editor, Istituto Superiore di Sanita, Italy; Orefice, Leucio, Editor, Istituto Superiore di Sanita, Italy; Stacchini, Angelo, Editor, Istituto Superiore di Sanita, Italy; 1996; ISSN 1123-3117; 278p; In Italian

Report No.(s): ISTISAN-96/34; Copyright; Avail: Issuing Activity (Istituto Superiore di Sanita, Rome, Italy), Hardcopy, Microfiche

The main analytical methods used by the Istituto Superiore di Sanita for food chemical control are given. This handbook may be used by local health authorities both for practical application and for the publication of more specific manuals based on local needs. The report consists of two parts: a short general introduction explaining the commonly used recommendations and procedures applied in most chemical methods and a section devoted to a description of methods according to the parameters utilized. For some of the methods adopted, it is necessary to wait for the reaction deriving from their actual usage and implementation. Future editions of the work will contain up-to-date corrections and revisions based on the application and validation of the methods proposed.

Derived from text

Manuals; Health

19970026606 Prins Maurits Lab. TNO, Rijswijk, Netherlands

Improvement of Filter Beds of Activated Carbon, Part 1, Simplified Correlation for the life time *Verbetering actieve kool-filters, Deel 1, Eenvoudige correlatie voor schatting van de gebruiksduur*

Mallens, E. P. J., Prins Maurits Lab. TNO, Netherlands; Duisterwinkel, A. E., Prins Maurits Lab. TNO, Netherlands; Dankers, H., Prins Maurits Lab. TNO, Netherlands; Jun. 1997; 41p; In Dutch

Contract(s)/Grant(s): A95/KLu/406

Report No.(s): TD96-0438; PML-1996-A111; Copyright; Avail: Issuing Activity (TNO Prins MauritsLab., PO Box 45, 2280AA Rijswijk, The Netherlands, Hardcopy, Microfiche

A method to determine whether a filter bed of activated carbon can be of use in the protection against components of high volatility at known conditions was developed. In this report the usefulness of a relatively simple method to estimate the life time

of a filter bed is discussed. Comparison between the calculated and measured so-called 1 % breakthrough time showed that this time interval can be calculated with an accuracy of 15%. This correlation is valid at conditions typical for filter beds used in practice. In case of very volatile components, however, the error in the calculated value of the breakthrough time can increase strongly. Moreover, the correlation is only valid in case both the activated carbon and the air flowing through the filter bed are dry. However, the number of situations in which the breakthrough time can be calculated accurately is too restricted by these boundary conditions. A modification of the correlation presented in this report is possible, but does not show much perspective. Therefore in the continuation of the project a different approach will be applied, based on an advanced adsorption process simulation model, which is currently being developed at TNO-PML.

Author

Activated Carbon; Life (Durability); Adsorption; Fluid Filters; Air Flow

19970026895 Texas A&M Univ., Engineering Technology Dept., College Station, TX USA

Integration of CELSS Simulation with Long-Term Crop Scheduling *Final Report*

Leon, V. Jorge, Texas A&M Univ., USA; National Aeronautics and Space Administration (NASA)/American Society for Engineering Education (ASEE) Summer Faculty Fellowship Program: 1996; Jun. 1997; Volume 2; 16p; In English; Also announced as 19970026889; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

This project presents guidelines for the integration of the Intelligent Crop Scheduler (ICS) developed by Leon (1995) with a version of the Biological Life Support System (BLSS) simulation based on the work by Volk and Rummel (1987). These guidelines will also aid in defining the appropriate model detail of simulation-based schedulers. ICS determines what, when and how much to plant of different crops. These decisions are made such that the critical reservoir levels are maintained close to their nominal or desired settings during the duration of the mission. Initial feasibility of the approach has been demonstrated using simplified implementations of the scheduling approach and CELSS 'world' model developed by the investigator at JSC in the Summer of 1995. The BLSS model incorporates more detail. The increased fidelity is in terms of added mass-regeneration formalism (biochemical stoichiometry), more plants, and more accurate modeling of the mechanical system. This report describes the main features of the Crop scheduler and CELSS simulator, discusses integration issues, and provides with detailed guidelines for the integration of these two applications.

Author

Closed Ecological Systems; Biochemistry; Farm Crops; Life Sciences

19970026898 Texas A&M Univ., Engineering Technology Dept., College Station, TX USA

A Human Factors Analysis of EVA Time Requirements *Final Report*

Pate, Dennis W., Texas A&M Univ., USA; National Aeronautics and Space Administration (NASA)/American Society for Engineering Education (ASEE) Summer Faculty Fellowship Program: 1996; Jun. 1997; Volume 2; 16p; In English; Also announced as 19970026889

Contract(s)/Grant(s): NGT-44-001-800; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

Human Factors Engineering (HFE) is a discipline whose goal is to engineer a safer, more efficient interface between humans and machines. HFE makes use of a wide range of tools and techniques to fulfill this goal. One of these tools is known as motion and time study, a technique used to develop time standards for given tasks. During the summer of 1995, a human factors motion and time study was initiated with the goals of developing a database of EVA task times and developing a method of utilizing the database to predict how long an EVA should take. Initial development relied on the EVA activities performed during the STS-61 (Hubble) mission. The first step of the study was to become familiar with EVA's, the previous task-time studies, and documents produced on EVA's. After reviewing these documents, an initial set of task primitives and task-time modifiers was developed. Data was collected from videotaped footage of two entire STS-61 EVA missions and portions of several others, each with two EVA astronauts. Feedback from the analysis of the data was used to further refine the primitives and modifiers used. The project was continued during the summer of 1996, during which data on human errors was also collected and analyzed. Additional data from the STS-71 mission was also collected. Analysis of variance techniques for categorical data was used to determine which factors may affect the primitive times and how much of an effect they have. Probability distributions for the various task were also generated. Further analysis of the modifiers and interactions is planned.

Author

Space Transportation System; Human Factors Engineering; Extravehicular Activity; Astronauts

19970026969 NASA Johnson Space Center, Houston, TX USA

Understanding Skill in EVA Mass Handling, Volume 1, Theoretical and Operational Foundations

Riccio, Gary, Nascent Technologies, USA; McDonald, Vernon, Nascent Technologies, USA; Peters, Brian, Krug Life Sciences, Inc., USA; Layne, Charles, Krug Life Sciences, Inc., USA; Bloomberg, Jacob, NASA Johnson Space Center, USA; Jun. 1997; 36p; In English

Contract(s)/Grant(s): RTOP 199-16-11-48

Report No.(s): NASA-TP-3684; S-827; NAS 1.60:3684; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report describes the theoretical and operational foundations for our analysis of skill in extravehicular mass handling. A review of our research on postural control, human-environment interactions, and exploratory behavior in skill acquisition is used to motivate our analysis. This scientific material is presented within the context of operationally valid issues concerning extravehicular mass handling. We describe the development of meaningful empirical measures that are relevant to a special class of nested control systems: manual interactions between an individual and the substantial environment. These measures are incorporated into a unique empirical protocol implemented on NASA's principal mass handling simulator, the precision air-bearing floor, in order to evaluate skill in extravehicular mass handling. We discuss the components of such skill with reference to the relationship between postural configuration and controllability of an orbital replacement unit, the relationship between orbital replacement unit control and postural stability, the relationship between antecedent and consequent movements of an orbital replacement unit, and the relationship between antecedent and consequent postural movements. Finally, we describe our expectations regarding the operational relevance of the empirical results as it pertains to extravehicular activity tools, training, monitoring, and planning.

Author

Extravehicular Activity; Protocol (Computers); Controllability; Stability

19970027053 Earth Technology, Inc., San Antonio, TX USA

Preventing Work-Related Musculoskeletal Illnesses Through Ergonomics: The Air Force PREMIER Program, Volume 2, Job Requirements and Physical Demands Survey Methodology Guide Final Report, 1996

Marcotte, Andrew, Little (Arthur D.), Inc., USA; Barker, Richard, Little (Arthur D.), Inc., USA; Joyce, Marilyn, Little (Arthur D.), Inc., USA; Miller, Nancy, Earth Technology, Inc., USA; Cogburn, Edward J., Armstrong Lab., USA; Klineberg, Edward J., Armstrong Lab., USA; Goddard, Don E., Armstrong Lab., USA; Feb. 1997; 183p; In English

Contract(s)/Grant(s): F41624-95-D-9016

Report No.(s): AD-A325512; AL/OE-TR-96-0158-Vol-2; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

The USA Air Force consists of over 500,000 military and civilian workers performing diverse jobs and tasks at multiple installations around the world. A typical installation has hundreds of administrative and industrial work areas of various sizes. In industrial work areas, workers perform maintenance/inspection jobs where exposure often vary on a daily basis. This report describes a methodology which allow technicians with minimal ergonomics training to help focus and prioritize population based ergonomic improvement efforts in an efficient and standardized manner. Results of pilot testing for reproducibility, sensitivity, validity, and practicality are also included.

DTIC

Musculoskeletal System; Populations; Sensitivity; Tasks

19970027063 Earth Technology, Inc., San Antonio, TX USA

Preventing Work-Related Musculoskeletal Illnesses Through Ergonomics: The Air Force PREMIER Program, Volume 2, Job Requirements and Physical Demands Survey Methodology Guide (Field Version) Final Report, 1996

Marcotte, Andrew, Little (Arthur D.), Inc., USA; Barker, Richard, Little (Arthur D.), Inc., USA; Joyce, Marilyn, Little (Arthur D.), Inc., USA; Miller, Nancy, Earth Technology, Inc., USA; Cogburn, Edward J., Armstrong Lab., USA; Klineberg, Edward J., Armstrong Lab., USA; Goddard, Don E., Armstrong Lab., USA; May 1997; 127p; In English

Contract(s)/Grant(s): F41624-95-D-9016

Report No.(s): AD-A325511; AL/OE-TR-96-0158-Vol-2; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The USA Air Force consists of over 500,000 Military and civilian workers performing diverse jobs and tasks at multiple installations around the world. A typical installation has hundreds of administrative and industrial work areas of various sizes. In industrial work areas, workers perform maintenance/inspection jobs where exposure often vary on a daily basis. This report describes a methodology which allow technicians with minimal ergonomics training to help focus and prioritize population based ergonomic improvement efforts in an efficient and standardized manner. Results of pilot testing for reproducibility, sensitivity, validity, and practicality are also included.

DTIC

Human Factors Engineering; Musculoskeletal System; Exposure; Sensitivity; Populations

Subject Term Index

A

ACCIDENT INVESTIGATION, 19
ACOUSTIC ATTENUATION, 22, 23, 24, 25
ACOUSTICS, 10
ACTIVATED CARBON, 26
ACTIVE CONTROL, 10, 22, 23, 24
ACTIVITY (BIOLOGY), 3, 12
ACTIVITY CYCLES (BIOLOGY), 7
ADRENOCORTICOTROPIN (ACTH), 8
ADSORPTION, 26
AEROSPACE MEDICINE, 13, 18
AIR, 11
AIR FLOW, 26
AIR NAVIGATION, 14
AIR POLLUTION, 14
AIR QUALITY, 20
AIR TRAFFIC CONTROL, 17
AIR TRAFFIC CONTROLLERS (PERSONNEL), 14, 17
AIRCRAFT ACCIDENTS, 19
AIRCRAFT COMMUNICATION, 10
AIRCRAFT NOISE, 23, 25
AIRCRAFT PILOTS, 20, 22, 23
AIRCRAFT SAFETY, 18
ALTITUDE, 10
AMINO ACIDS, 8
ANALYZING, 5
ANATOMY, 2
ANTIBIOTICS, 6
ANTIBODIES, 1, 3, 11
ARMED FORCES, 9, 20
ARMOR, 24
ARRAYS, 19
ARTHROPODS, 8
ASSAYING, 4
ASTRONAUTS, 26
AUDIO EQUIPMENT, 15, 21, 22
AUDITORY DEFECTS, 24
AUDITORY FATIGUE, 23, 25
AUDITORY PERCEPTION, 9, 15, 22, 24
AUDITORY SIGNALS, 13, 15
AUDITORY STIMULI, 17

B

BACTERIA, 1, 6, 7, 9, 19
BINOCULAR VISION, 17
BIOCHEMISTRY, 5, 26
BIOINSTRUMENTATION, 6

BIOLOGICAL EFFECTS, 5
BIOLOGY, 1
BIOLUMINESCENCE, 6
BIOREACTORS, 7, 11
BLOOD, 3
BONE MINERAL CONTENT, 4
BONES, 4
BRAIN, 2

C

CALMODULIN, 2
CANCER, 9
CARCINOGENS, 19
CATHODE RAY TUBES, 20
CELLS (BIOLOGY), 3, 4, 7
CHROMATOGRAPHY, 9
CIRCADIAN RHYTHMS, 5, 7
CLINICAL MEDICINE, 7
CLOSED ECOLOGICAL SYSTEMS, 26
COASTAL WATER, 1
COCKPIT SIMULATORS, 20
COCKPITS, 15, 20
COLLISION AVOIDANCE, 15
COMMUNICATION EQUIPMENT, 23
COMPOSITE MATERIALS, 22
COMPUTER PROGRAMS, 12
COMPUTERIZED SIMULATION, 17
CONFERENCES, 18
CONNECTIVE TISSUE, 12
CONTAMINATION, 5
CONTINUOUS NOISE, 10
CONTROLLABILITY, 27
CORTICOSTEROIDS, 8
COSMIC RAYS, 11
CULTURE TECHNIQUES, 3, 4
CYTOLOGY, 4, 11

D

DATA ACQUISITION, 14
DATA BASES, 13
DECISION MAKING, 17
DESIGN ANALYSIS, 19, 21, 22, 23
DETECTION, 6, 10
DIGITAL SYSTEMS, 23
DISORIENTATION, 18, 19
DISPLAY DEVICES, 15, 16

E

EAR PROTECTORS, 9, 10, 20, 21, 22, 23, 24, 25
EARPHONES, 10, 21, 22, 23, 24
ECOSYSTEMS, 1
EDUCATION, 14
ELECTROPHORESIS, 9
EMERGENCIES, 17
ENERGY CONSERVATION, 14
ENVIRONMENT PROTECTION, 9
ENZYME ACTIVITY, 6
EPIDEMIOLOGY, 2, 12
ESCHERICHIA, 6
EUKARYOTES, 7
EVALUATION, 11, 14
EXAMINATION, 6, 16
EXPERIMENTATION, 6
EXPOSURE, 5, 27
EXTRAVEHICULAR ACTIVITY, 26, 27
EYE MOVEMENTS, 17

F

FABRICATION, 22
FARM CROPS, 26
FATIGUE (BIOLOGY), 16
FEASIBILITY, 19
FEEDFORWARD CONTROL, 23
FISHES, 5
FLAT PANEL DISPLAYS, 20
FLEXORS, 12
FLIGHT CREWS, 10, 16, 21, 23, 24, 25
FLIGHT OPERATIONS, 15
FLIGHT SAFETY, 19
FLIGHT SIMULATION, 10, 16, 20
FLIGHT TESTS, 24
FLUID FILTERS, 26
FLYING PERSONNEL, 14
FOOD, 5
FREQUENCIES, 3

G

GENE EXPRESSION, 7
GENERAL AVIATION AIRCRAFT, 10
GLUTAMATES, 10
GLUTAMIC ACID, 10
GOGGLES, 21
GRAVITATION, 5

GROUND BASED CONTROL, 4
GROUND WATER, 19

H

HANDBOOKS, 5
HEALTH, 9, 19, 25
HEARING, 9, 13, 20, 22, 23, 24, 25
HEART, 2
HELICOPTERS, 18
HELMETS, 21, 22, 24
HUMAN BODY, 2, 13
HUMAN FACTORS ENGINEERING,
13, 20, 21, 22, 23, 25, 26, 27
HUMAN PERFORMANCE, 14, 16
HUMAN-COMPUTER INTERFACE, 19
HYGIENE, 5
HYPOXIA, 10

I

IMMUNE SYSTEMS, 3
INDOOR AIR POLLUTION, 20
INJURIES, 12, 19
INTERNATIONAL SPACE STATION, 7
ION EXCHANGING, 3
IONS, 11

J

JUDGMENTS, 17

K

KIDNEYS, 2
KNOWLEDGE, 16

L

LIFE (DURABILITY), 26
LIFE SCIENCES, 26
LIFE SUPPORT SYSTEMS, 19
LIQUID CHROMATOGRAPHY, 5
LIVER, 2
LOUDNESS, 20
LUMINOUS INTENSITY, 5
LYMPHOCYTES, 3, 11

M

MAGNETIC RESONANCE, 2
MAMMALS, 7
MANUALS, 25

MARINE ENVIRONMENTS, 1
MASS SPECTROSCOPY, 5
MASS TRANSFER, 7
MEDICAL SERVICES, 11, 12
MICROBIOLOGY, 5
MICROGRAVITY, 3, 4, 7, 11
MICROORGANISMS, 1
MICROPHONES, 23
MILITARY AIRCRAFT, 15
MILITARY HELICOPTERS, 24
MILITARY OPERATIONS, 22
MILITARY VEHICLES, 24
MOLECULAR BIOLOGY, 5
MOLECULES, 2
MONKEYS, 3
MOTION PERCEPTION, 17
MULTIPLEXING, 9
MUSCULAR FUNCTION, 12
MUSCULOSKELETAL SYSTEM, 4, 7,
12, 27

N

NASA PROGRAMS, 2
NERVOUS SYSTEM, 8
NEURONS, 7
NOISE (SOUND), 13
NOISE INJURIES, 20, 21, 23
NOISE REDUCTION, 9, 10, 20, 21, 22,
23, 24, 25
NUCLEI (CYTOLOGY), 7

O

OCCUPATIONAL DISEASES, 25
OPHTHALMOLOGY, 17
ORGANISMS, 5
ORGANS, 2
OSCILLATIONS, 7
OVARIES, 2
OZONE, 11

P

PATHOGENS, 7, 9
PERSONALITY TESTS, 17
PERSONNEL, 16
PHOTOLITHOGRAPHY, 1
PHYSICAL FITNESS, 12
PHYSIOLOGICAL EFFECTS, 8, 19
PHYSIOLOGICAL FACTORS, 18
PHYSIOLOGICAL RESPONSES, 10
PHYSIOLOGY, 11
PHYTOPLANKTON, 1

PILOT PERFORMANCE, 10
PITUITARY GLAND, 3, 4
PITUITARY HORMONES, 2, 3, 4
PLANTS (BOTANY), 2
POPULATIONS, 27
POTABLE WATER, 19
POTATOES, 2, 8
PREGNANCY, 2
PROCEDURES, 5
PRODUCT DEVELOPMENT, 2, 14
PROPRIOCEPTION, 18
PROTEINS, 6
PROTOCOL (COMPUTERS), 27
PSYCHOLOGICAL EFFECTS, 16
PSYCHOMOTOR PERFORMANCE, 16
PSYCHOPHYSICS, 17
PUBLIC HEALTH, 11

R

RANDOM NOISE, 13
RATS, 2, 3, 4
REACTIVITY, 3
REAL TIME OPERATION, 10, 23
RESPIRATORY SYSTEM, 7
RISK, 9
ROBOTS, 18

S

SACCADIC EYE MOVEMENTS, 13
SACCHAROMYCES, 7
SCALE MODELS, 12
SENSE ORGANS, 18
SENSITIVITY, 27
SEQUENCING, 13
SIGNAL ANALYZERS, 23
SIGNIFICANCE, 11
SKULL, 12
SOLUBILITY, 6
SOUND INTENSITY, 20
SOUND LOCALIZATION, 15
SOUND PRESSURE, 25
SPACE FLIGHT, 4, 11
SPACE SHUTTLES, 2
SPACE TRANSPORTATION SYSTEM,
26
SPACE TRANSPORTATION SYSTEM
FLIGHTS, 7
SPATIAL DISTRIBUTION, 7, 16
SPATIAL MARCHING, 16
SPATIAL RESOLUTION, 13
SPEECH RECOGNITION, 17, 23, 24
STABILITY, 27

STIFFNESS, 12
STIMULATION, 8
STRESS (PSYCHOLOGY), 16
SYMBIOSIS, 6

T

TASKS, 27
TEAMS, 16
TEXTURES, 17
TISSUES (BIOLOGY), 4
TOXICITY, 8
TOXINS AND ANTITOXINS, 9
TRANSVERSE OSCILLATION, 12

U

USER MANUALS (COMPUTER PROGRAMS), 12

V

VEGETATION GROWTH, 8
VENTILATION, 20
VIRUSES, 2, 7, 19
VISUAL PERCEPTION, 17
VISUAL STIMULI, 13
VISUAL TASKS, 15, 16
VOICE COMMUNICATION, 9, 15, 20,
21, 22, 23, 24

W

WALKING, 18
WARNING SYSTEMS, 15
WATER TREATMENT, 19
WAVEFORMS, 13
WEIGHT (MASS), 21
WEIGHTLESSNESS, 4
WHITE NOISE, 10
WORKLOADS (PSYCHOPHYSIOLOGY), 16

Y

YEAST, 7

Z

ZOOPLANKTON, 8

Personal Author Index

A

Almeida, Sandra A., 12
Alvarez, Eduardo A., 18
An, G., 8
An, Gynheung H., 2
Anderson, B. Wayne, 23
Andre, Eric, 3
Arnold, Mark A., 10
Avery, L., 4

B

Badong, Elizabeth, 12
Baldini, Massimo, 25
Baldwin, Thomas O., 6
Barker, Richard, 27
Beasley, Howard H., 20
Begley, Cynthia M., 6
Beninga, Kathy, 9
Bloomberg, Jacob, 27
Bolanowski, Stanley J., 19
Bots, M. J., 15
Braithwaite, Malcolm G., 18
Brammer, A. J., 23
Broach, Dana, 13
Buck, K., 9, 20
Burden, H. W., 1
Burin, Amy D., 12

C

Carey, Sean K., 20
Cenci, R., 3
Clere, J. M., 21
Cogburn, Edward J., 27
Cooper, David, 11
Crabtree, R. B., 22, 23

D

Dancer, A., 9
Dankers, H., 25
Darlington, P., 24
Davenport, Clark E., 16
Davidson, Kowetha A., 9
Davis, M., 1
DeCoster, M., 8
DelVecchio, Vito G., 9
DeMedici, Dario, 5

DeRoche, Shannon L., 18
DojmiDiDelupis, Gianluigi, 8
Dollar, Carolyn S., 17
Doty, Steven, 3
Duisterwinkel, A. E., 25

E

Elias, Bartholomew, 14

F

Fabietti, Fabio, 25
Fenicia, Lucia, 5
Fuller, Charles, 5
Funari, Enzo, 19

G

Garinther, Georges R., 23
Giammarioli, Stefania, 25
Gin, Karina Y., 1
Globus, Ruth, 3
Goddard, Don E., 27
Goodwin, Thomas J., 4
Grateau, P., 21
Gray, Gregory C., 7
Grindelnd, R. E., 3, 4
Gromelski, Stan, 14

H

Hamery, P., 9
Han, T.-J., 8
Han, Tae-Jin, 2
Harding, Thomas H., 19
Harrington, Lawrence K., 13
Hawkins, Leigh K., 9
Hebert, M., 8
Hodson, C. A., 1
Husson, David, 3
Hymer, W. C., 3, 4

J

Jaeger, Jennifer A., 12
Jensen, E. S., 25
Jones, J., 20
Jonnalagadda, P., 1
Joyce, Marilyn, 27

K

Kidd, Gary R., 13
King, Robert, 24
Kinne, Stephen M., 10
Kleis, Stanley J., 6
Klineberg, Edward J., 27
Klinenberg, Edward J., 27
Klymenko, Victor, 19
Konietzko, J., 21
Krishnan, K., 3

L

Laudenslager, Mark S., 14
Lawrence, I. E., 1
Layne, Charles, 27
Lemoine, Sandra M., 11
Leon, V. Jorge, 26
Levin, Julian C., 16
Licata, Michael J., 6
Licina, Joseph R., 19
Luz, James T., 12

M

Mallens, E. P. J., 25
Manning, Carol A., 13
Marcotte, Andrew, 27
Martin, John S., 19
Martin, Russell L., 15
Maxwell, D. W., 21
McAnally, Ken I., 15
McDonald, Vernon, 27
McEntire, B. J., 19
McGinnis, Michael R., 7
McIntosh, J. R., 1
McKinley, Richard L., 24
Mcleskey, Ferne K., 9
Meyerhoff, J. L., 8
Miller, Nancy, 27
Morris, Linda J., 24
Mozo, Ben T., 22
Mukai, C., 3

N

Nagaoka, S., 3
Nesthus, Thomas E., 10
Nixon, Charles W., 24

O

Oldenburg, J. N. S., 25
Oldfield, Simon R., 15
Onori, Roberta, 25
Orefice, Leucio, 5, 25
Ossard, C., 21
Osterhammel, P. A., 25
Ottaviani, Massimo, 19

P

Pan, G. J., 23
Parker, Simon P. A., 15
Parmentier, G., 9, 20
Pastore, Richard E., 16
Pate, Dennis W., 26
Pellieux, L., 22
Pellis, Neal R., 11
Peters, Brian, 27
Pongratz, H., 21
Poovaiah, B. W., 8
Poovaiah, Bachettira W., 2
Potegal, M., 8

R

Rabin, Jeff C., 20
Ramalka, Catherine A., 9
Rash, Clarence E., 20
Rasmussen, A. Norby, 25
Reese, Melisa A., 18
Reppert, Steven M., 7
Reynaud, G., 21, 22
Ribera, John E., 22
Riccio, Gary, 27
Rico-Hesse, Rebeca, 2
Rogers, C. T., 1
Rojeski, P., 20
Rood, G. M., 24
Rose, D.-M., 21
Ruby, Edward G., 5
Rush, Ladonna L., 10

S

Salada, T., 3, 4
Sarafian, D., 22
Schaafstal, A. M., 15
Schaffar, Laurance, 3
Schmitt, Didier A., 3
Schroeder, David J., 17
Shaffer, Richard A., 12
Shaw, Joe J., 9

Show, Ivan T., 12
Simpson, Carol, 24
Singh, H., 20
Sollenberger, Randy L., 14
Sonnenfeld, Gerald, 3
Stacchini, Angelo, 4, 5, 25
Steeneken, H. J. M., 23
Stein, Earl S., 14

T

Takezawa, D., 8
Takezawa, Daisuke, 2
Thomas, G. B., 21
Tkaczuk, Jean, 3
Todd, James T., 17
Turano, Kathleen A., 17

V

VanDyke, P. R., 21
Verhave, J. A., 23
Vesterhauge, S., 25
Voisine, Joel J., 19

W

Wagstaff, A. S., 10
Watson, Charles S., 13
Wei, J., 13
Welsch, H., 21
White, Martin R., 12
Williams, Karen M., 12
Wolf, David A., 4
Woxen, O. J., 10
Wreggit, Steven S., 10
Wu, Shaw-Jye, 9

Z

Zary, J., 1
Ziegler, Miriam M., 6
Zill, Sasha N., 18

Report Documentation Page

1. Report No. NASA SP-7011 (449)	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Aerospace Medicine and Biology A Continuing Bibliography (Supplement 449)		5. Report Date October 06, 1997	
		6. Performing Organization Code	
7. Author(s)		8. Performing Organization Report No.	
		10. Work Unit No.	
9. Performing Organization Name and Address NASA Scientific and Technical Information Program Office		11. Contract or Grant No.	
		13. Type of Report and Period Covered Special Publication	
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Langley Research Center Hampton, VA 23681		14. Sponsoring Agency Code	
		15. Supplementary Notes	
16. Abstract This report lists reports, articles and other documents recently announced in the NASA STI Database.			
17. Key Words (Suggested by Author(s)) Aerospace Medicine Bibliographies Biological Effects		18. Distribution Statement Unclassified – Unlimited Subject Category – 52	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 48	22. Price A03/HC